VII. STANDING COMMITTEES

A. Academic and Student Affairs Committee

Assessment of Student Learning

For information only.

BACKGROUND

The following materials are presented as a background to our presentation on the Assessment of Student Learning at UW.

We know that our faculty offer tremendous classes, and that our students study hard and are truly engaged in their work at UW. But how do we know what students are actually learning? Assessment of student learning is a major issue throughout education today, from K to 20. We take student learning seriously at UW, and have created what we see as thoughtful methods for measuring student learning. We will present on these issues at the February regents' meeting; the following material constitutes the background material for our presentation. You will hear from academic leaders, staff, faculty and students.

The materials here include:

1. Powerpoint overview from Catharine Beyer, Research Scientist, Office of Education Assessment, Undergraduate Academic Affairs. She will discuss our approach to assessment, and very briefly cover material in these slides that summarize the broad array of data and measures that we use, including capstone courses and new assessment work.
2. Capstone course, Henry M. Jackson School of International Studies. Professor Resat Kasaba, director of the Jackson School, will talk briefly on February 14 about the Jackson School's capstone project. This is a requirement for all undergraduate majors.
3. Senior Capstone Research Experience, School of Aquatic and Fishery Science. This capstone is a requirement for all undergraduate majors. Associate Professor Kerry Naish will talk briefly about the experience.
4. In addition, we will send all of the Regents a copy of *Inside the Undergraduate Teaching Experience: The University of Washington's Growth in Faculty Teaching Study*, by Catharine Beyer, Edward Taylor, and Gerald Gillmore.
5. We have included here a brief article from Inside Higher Ed on this remarkable new book.

VII. STANDING COMMITTEES

A. Academic and Student Affairs Committee

Assessment of Student Learning (continued p. 2)

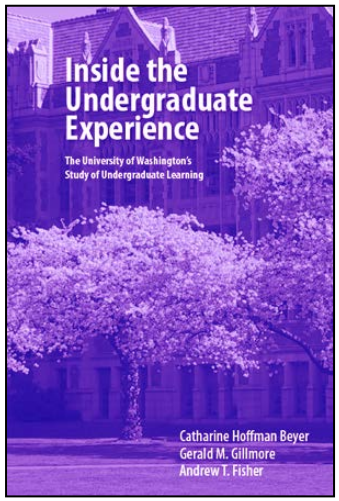
Attachments

1. UW's Evidence-driven Approach to Assessment of Student Learning
2. International Studies Program: Task Force Overview
3. 2013 Task Forces Titles and Descriptions
4. Task Force 2013 Student Handbook
5. Indonesia Task Force 2012
6. School of Aquatic & Fishery Sciences Senior "Capstone" Research Experience
7. Inside Higher Education article

UW's Evidence-driven Approach to Assessment of Student Learning

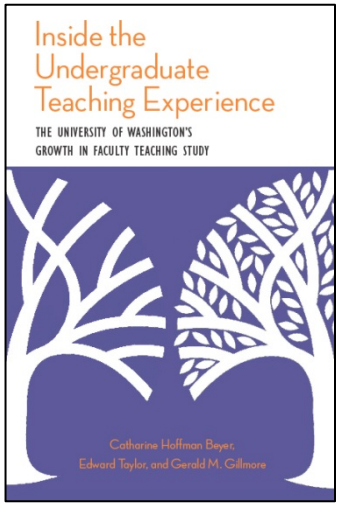
The UW SOUL

A longitudinal study tracking the learning of 304 UW undergraduates for four years



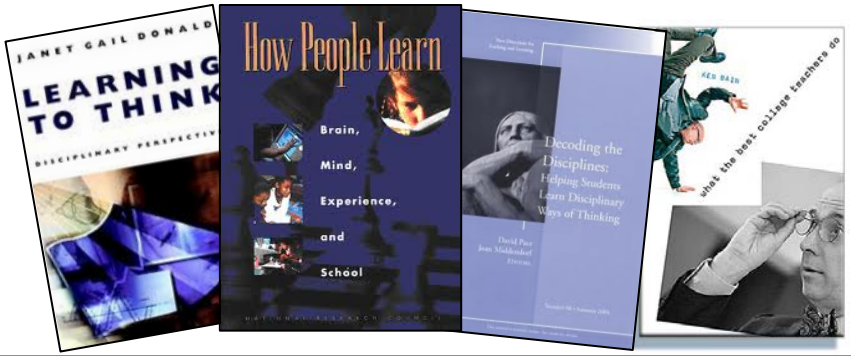
The UW GIFTS

An interview study of 55 UW faculty from across the curriculum on change in their teaching.



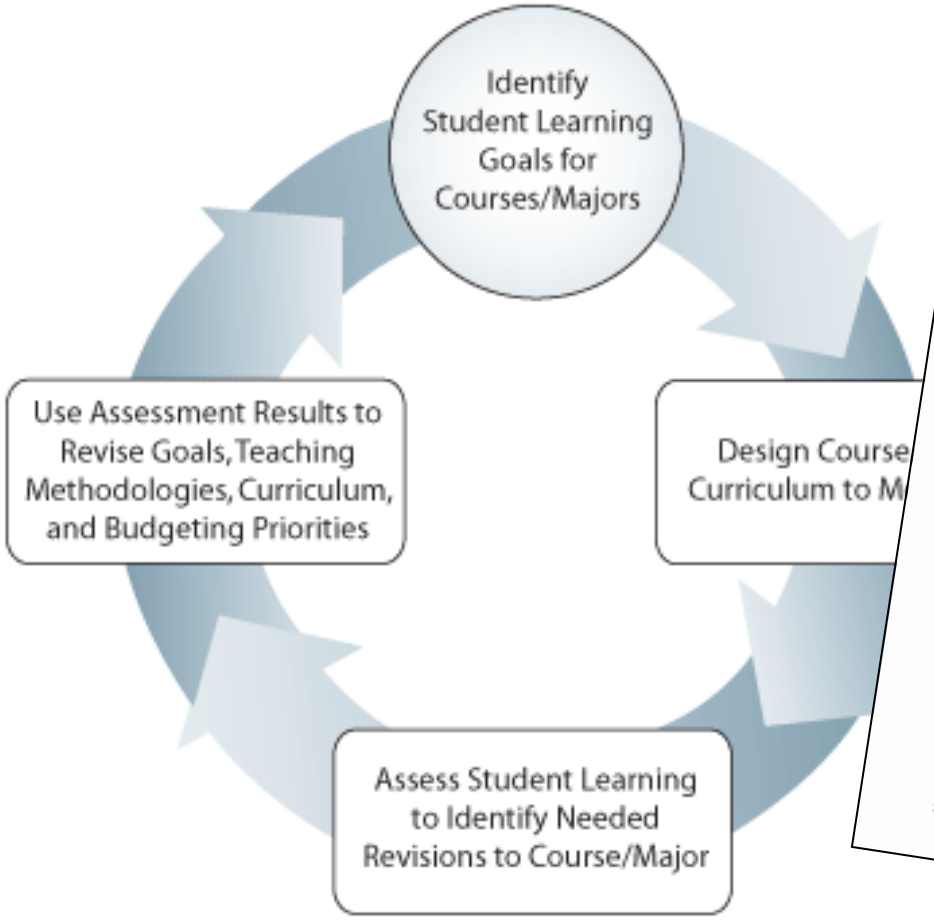
Top-down, centrally-administered, general or standardized assessment of student learning in college

Informed by a strong research foundation



Assessment of college student learning that is seated in the academic departments and is conducted by experts in those fields of learning

However, a focus on departmental assessment is neither quick nor easy. It requires that faculty set learning goals/objectives for students in the major, engage in meaningful assessment of both student performance and student perception of their learning experience at the course-level and at the departmental level, and have both ways and means to implement the curricular changes that assessment may suggest.



Learning in the Major:
Geography Student Portfolio Assessment

Suzanne Davies Withers
Craig Jeffrey
Tim Nyerges

Project Purpose: Substantively, this study aims to determine the extent to which departmental learning goals are evident in student learning outcomes. The question addressed is, whether as a faculty, we are we achieving our learning goals in the major. The methodological purpose of this study is to evaluate the utility of student portfolio assessment for involving faculty in outcomes assessment. The question addressed is whether student portfolios are a sound approach for involving faculty in outcomes assessment. Do student portfolios reflect the alignment of departmental learning goals with student learning outcomes?

Project Timeline: September, 2005 – September 2006.

Background and Rationale:
In 1996 the Geography department initiated a meaningful assessment of student learning outcomes with the G-LOOP (Geography Learning Objectives and Outcomes Project[1]) Project. Since the inception of G-LOOP, the Geography department has completed several phases in the process of creating a *sustainable culture of assessment*. Learning goals have been generated for every course. Learning goals have been developed for program concentrations. Departmental learning goals have been enumerated. These learning goals are distributed to students and faculty on course syllabi, websites, and course evaluations. Throughout our curriculum, learning goals have been integrated into the design of assignments and courses. Though not yet programmatic, in many instances student course assessments are being used to monitor whether learning goals are being realized. We have redesigned our curriculum and major requirements to help us achieve these learning goals. We have been recognized as a campus leader in assessing undergraduate learning, having twice (in 1997 and 2005) been invited to describe our G-LOOP project to the Board of Regents, been the first winners of the Brotman Award for Excellence in Undergraduate Education (1999), and received a Tools for Transformation Grant in 2000.

[1] Funded solely by the departmental funds from 1997-2000, and a small Tools for Transformation grant in 2000.

Assessing Teaching & Learning at the University of Washington

Institutional Approaches

Accreditation ~ NW Commission on Colleges & Universities

Regional/National Evaluation

Institutional Data & State Accountability Measures

Includes grad & retention rates and other measures
http://www.washington.edu/admin/factbook/

Focused Studies on Teaching & Learning

- 2013: UW Academic Challenge and Engagement Study (UW ACES) –63 academic advisors interviewing seniors in 33 UW departments about challenge in the major
- 2013: UW Learning in Embodied and Artistic Disciplines Study (UW LEADS) –teaching and learning in Art, Dance, Drama, Music, Physical Therapy, & coached athletics
- 2012: UW Growth in Faculty Teaching Study (UW GIFTS) *Inside the Undergraduate Teaching Experience,* Beyer, Taylor, & Gillmore, 2013
- 2012: Exit Survey Initiative (ESI)
- 2009: UW Senior Research Study (UW SRS)
- 2007: UW Study of Undergraduate Learning (UW SOUL), *Inside the Undergraduate Experience,* Beyer, Gillmore, & Fisher, 2007

OEA Surveys of Students, Alumni (1, 5, & 10 Yrs Post Grad) & Faculty

http://www.washington.edu/oea/pdfs/reports/OEAReport1101.pdf

Biennial Departmental Assessment Charts

Reports from UW Departments
http://www.washington.edu/oea/pdfs/reports/OEAReport1102.pd

Specialized & National Studies

For example, the National Survey of Student Engagement
http://www.washington.edu/oea/pdfs/reports/OEAReport0905.pdf

Departmental Approaches

Learning Goals for Majors

All UW departments offering undergraduate degrees have learning goals for majors available at:
http://www.washington.edu/oea/pdfs/reports/OEAReport1102.pdf

Curricular Mapping & Review

Identifying where in the curriculum students learn the knowledge and develop the skills listed in the departmental learning goals

Performance-based Measures

Using **capstone courses, or projects/ performances in targeted courses,** portfolio assessment, national exams and other authentic student work—evaluated by faculty and/or external audiences—to assess learning

Perception-based Measures

Aggregate course evaluations, student self-assessment, exit surveys, focus groups, internship/work review by employers/community partners, & input from employer advisory boards/groups

Information about Faculty

Research, publications, awards, specialties, and other information

UW Ten-Year Academic Review Process & National Departmental Accreditation Processes

Course-based Approaches

Classroom Assessment Techniques

Use of in-class activities and out-of-class assignments to monitor student learning.
(See *Inside the Undergraduate Teaching Experience,* Beyer, Taylor, & Gillmore, 2013, for examples of UW faculty using classroom assessment to monitor and improve student learning.)

Course Evaluations & Peer Review

- Peer review of faculty teaching
- Course evaluation ~ 13 forms suitable for a variety of kinds of courses + comment sheets for use in-class or online
- Challenge Index ~ information from course evaluations on student perceptions of rigor

Faculty Development

- Center for Teaching and Learning
- A wide range of teaching training opportunities, including Faculty Fellows, Large Lecture Collegium, Institute for Teaching Excellence, and many others

Other

Mentoring ~ Formal and Informal

Conversations, Books, & Articles on Learning across Institutions

Conversations with Students ~ Formal and Informal

University of Washington
Undergraduate Academic Affairs
Office of Educational Assessment, 2013

Assessing Teaching & Learning at the University of Washington

Some areas of recent assessment work at UW…

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Conversations, Books, & Articles on Learning across Institutions

Conversations with Students ~ Formal and Informal

University of Washington
Undergraduate Academic Affairs
Office of Educational Assessment, 2013

Focusing on Capstone Courses/experiences as a Way to Assess Student Learning

Performance-based Measures

Using **capstone courses, or projects/ performances in targeted courses,** portfolio assessment, national exams and other authentic student work—evaluated by faculty and/or external audiences—to assess learning

- Capstone courses/experiences typically ask students to produce a piece of work that demonstrates their cumulative learning in the major. The goals for learning in capstones are the same as the learning goals for the major.

- Therefore, student work in capstones can be used in two ways: 1. to assess individual students' learning in the major; 2. to assess the success of the department's undergraduate curriculum.

- About 66% of the UW's majors included some kind of capstone experience in 2011 (about 45% of Arts & Sciences majors).

- We are hoping in the next biennium to help departments that offer capstones use their students' work to assess their curricula and to help departments not having capstones identify courses/experiences that might serve as capstone "substitutes."

- Capstone examples: International Studies (Dr. Resat Kasaba) and Aquatic & Fishery Sciences (Dr. Kerry Naish)

Other New Assessment Work:
Institutional Approaches with a Disciplinary Focus

The UW Academic Challenge and Engagement Study (UW ACES)

Using 5-10 minute interviews with seniors applying for graduation, 64 academic advisors from 33 departments across the UW who have been trained in interviewing techniques are asking seniors applying for graduation the following questions: 1) What is the most challenging project or assignment they completed in the major—the assignment that most stretched their thinking; 2) what made the project challenging; and 3) how they learned to meet those challenges. Interview results will be analyzed by undergraduate researchers in each participating department who have been trained in qualitative analysis by researchers in OEA.

The UW Learning in Embodied and Artistic Disciplines Study (UW LEADS)

The purpose of the UW LEADS is to extend limited notions of what it means to learn in college by examining a little-studied and rarely-assessed area of teaching and learning—an area we are calling "embodied learning." These are the learning experiences—most often found in the arts and perhaps best exemplified by Dance majors—that require that students' bodies demonstrate what they have learned, thought, and analyzed, as well as what the students hope to express. Although Dance may offer the best example of such learning, embodied learning can be found in other disciplines, as well, and, along with Dance, the UW Leads includes Drama, Art, Music, Physical Therapy, and coached athletics. Using interviews with faculty, students, and alumni, this study seeks to answer the following questions: 1) What constitutes learning in embodied and artistic disciplines or practices? 2) How is that learning taught? 3) What are the applications of that learning inside and outside the disciplinary areas? and 4) How is learning typically assessed in these fields?

Exit Survey Initiative

In 2012, OEA researchers worked with more than 27 departments to help them improve their surveys of graduating seniors. Three focuses of this work were: improving administration of surveys to guarantee student anonymity and increase student response rates; ensuring that departments included questions about how well students felt they had met departmental learning goals for majors; and asking questions in such a way that results could be easily analyzed and passed on to faculty. Next steps include follow-up contact to participating departments.

Biennial Assessment Reports

At the end of the biennium (2013), UAA will ask all departments to submit assessment reports and will compile them into charts, such as those at http://www.washington.edu/oea/pdfs/reports/OEAReport1102.pdf. These charts allow the UW to know the learning goals for undergraduate programs, the methods departments use to assess those goals, and the changes departments make to their programs as a result of their assessment work.

THE HENRY M. JACKSON
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UNIVERSITY OF WASHINGTON
BOX 353650, THOMSON HALL, SEATTLE, WA
98195

CENTER FOR global studies UNIVERSITY OF WASHINGTON
& International Studies Program

International Studies Program: Task Force Overview
A Capstone Requirement for Undergraduate Majors
http://jsis.washington.edu/taskforce/

The International Studies Program at The Henry M. Jackson School of International Studies introduces students to international issues through rigorous coursework in a wide variety of disciplinary and cross-disciplinary settings. The Program equips students with the conceptual knowledge and analytical tools required to understand and address complex global issues. We know that our graduates will want to shape the world that they have studied – and be effective advisers, researchers, or managers in the arenas of international policy and advocacy.

Task Force (JSIS 495) is our required undergraduate capstone course. In groups of 15-17 individuals, students experience a simulated version of an international expert commission tasked with providing a research brief and policy recommendations. Task Force students apply what they have learned in the major and (1) comprehensively define the scope of a research project to inform a focused international policy challenge; (2) conduct independent research that informs policy recommendations; (3) produce a sophisticated piece of writing individually and as a member of a team; (4) collaborate with a group of peers to produce a book-length policy analysis that reads coherently from beginning to end; and, then (5) defend their policy recommendations to an expert evaluator. These experts are usually representatives of real world clients and they provide substantive comments and a critical oral review of the students' work. For our students, Task Force is the most memorable experience of their entire academic career.

Because of our students' comprehensive view on history, culture, geography, economics and policy, Task Force students bring fresh new perspectives and insights on international and global affairs. Our expert evaluators frequently remark on the quality of our students' work and the important insights our students bring to each project. Task Force offers students a chance to sharpen their research, analysis, and writing with in-depth attention to each component of the entire project. They practice the art of scoping very complex situations from multiple vantage points and distilling findings that are sensitive to both global and local conditions. And, they gain valuable collaborative work experience on a project in which academic rigor, real-world relevance, and writing skills are combined to produce a polished and presentable report.

The skills acquired and applied in Task Force help our students stand out as they step outside UW and towards the jobs and activities they are passionate about. At the end of the Task Force experience successful students have the ability to locate, compile, synthesize, evaluate and compellingly present complex and up-to-date information on rapidly changing global issues and to do so in a team-based environment. These abilities are highly valued in the worlds of policy-making, research, and enterprise.

ATTACHMENT 2

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CENTER FOR global studies UNIVERSITY OF WASHINGTON
& International Studies Program

2013 Task Forces | Titles and Descriptions

JSIS 495 A TTh 12.30-2.20 Sabine Lang

Making European Citizens: Assessing Challenges and the Road Ahead

One of the most pressing questions in the current Euro crisis is how much solidarity Europeans are willing to show and to what degree they are rooted in their identity as Europeans. Therefore, the 'making' of European citizens remains a central challenge for European integration. Early warning signs pointing to a lack of European identity were low turnouts for European Parliamentary elections and the failure of the Constitutional Process. In the current crisis, strong re-nationalization of public opinion and decision making fuels the perception of a deep-seated legitimacy deficit of the Brussels-based polity. Recently, the EU has tried to address this deficit with attempts to strengthen the European Parliament, to create a more powerful EU executive, to formalize organized civil society input, and to engage citizens more in EU affairs. But it seems as though too little has been done too late. Our task force will assess the current legitimacy deficit by identifying several areas in which this democratic challenge is obvious. We will then proceed to draft fact-based policy recommendations that could strengthen European citizenship.

Evaluator: Mr. Conny Reuter, President Social Platform, Solidar (independent international alliance of NGOs involved in social service provision, international co-operation, humanitarian aid, and life-long learning, based in Brussels)

JSIS 495 B MW 1.30-3.20 Brian Baird

First Amendment Rights, New Democracies and US Foreign Policy

In recent decades United States foreign policy has focused explicitly on promotion of democracy, but there typically has not been a comparable commitment to promoting the fundamental rights guaranteed in the First Amendment to our Constitution. Even in nations where democratic processes have taken root, the freedoms of religion, press, speech and assembly are well established neither in the minds of all the public nor in the practices of the governments and interest groups. Recent and tragic outbreaks of violence in the Middle East and elsewhere illustrate the challenges that can arise when the exercise of constitutional rights within our nation or nascent democracies conflicts with strongly held values, beliefs, practices and interests in other lands. This task force will explore the importance of promoting basic rights as an essential element of successful democracy and, more specifically, will consider if, why, and how the promotion of First Amendment rights can be more strongly and successfully championed by our government and embraced by other nations and their citizens.

Evaluator: Ambassador Ryan Crocker

JSIS 495 C MW 1.30-3.20 Scott Radnitz

US Policy toward Russia and Its Neighbors

The former Soviet Union provides more than its share of challenges for the rest of the world: loose nuclear weapons, "frozen" conflicts, drug trafficking, repressive governments, Islamist insurgency, and a

wealth of energy resources. American relations with Russia have waxed and waned over the years. After reaching their nadir in 2008, relations improved steadily until the disputed Russian election in 2012. Now the White House is faced with how to manage an irascible Russian president and his coterie of officials from the security sector, along with ongoing conflicts in the Caucasus, fragile regimes in Central Asia, and renewed autocracy in Ukraine. The Middle East may be America's top priority, but the president ignores Russia and its neighbors at his peril. This task force will instruct him on how to manage, if not prevent, the next crisis that will inevitably emerge from the region.
Evaluator: Andrew Kuchins, Director and Senior Fellow, Russia and Eurasia Program, Center for Strategic and International Studies

JSIS 495 D TTh 1.30-3.20 Mary Callahan

US-Burma Relations: Next Steps

In the last year, the bilateral rapprochement between the United States and the Government of the Union of Myanmar has been radically transformed. In large part, this change was possible because of an extraordinary political liberalization undertaken by the Myanmar military. This task force will make recommendations for the incoming presidential administration on how to influence the ongoing transition to democracy, assuming the momentum toward progressive reform continues. Task Force members will be expected to read a substantial amount of background material before winter quarter starts.
Evaluator: (invited) Kurt M. Campbell, Assistant Secretary for East Asian and Pacific Affairs, US Department of State

JSIS 495 E TTh 11.30-1.20 Scott Montgomery

A New Great Game? U.S. Interests in Central Asia: Azerbaijan, Kazakhstan, Turkmenistan

Azerbaijan, Kazakhstan, and Turkmenistan lie at the center of a global power struggle. This struggle may be muted when compared to the conflicts over Syria and North Korea. Yet it involves some of the same players—Russia, China, Europe, Iran, and the U.S.—and has been growing over time. Due to geography, resources, and long-term borderland status, Central Asia has been a nexus of great power rivalry since the 19th century Great Game between the British and Russian empires. Today, conflict has several dimensions, forming a "story" of challenging complexity. One dimension is resources—huge volumes of recoverable oil and gas to which Europe and China desperately want access, but which Russia wishes to control as part of its "near abroad." The U.S. would prefer these resources be responsibly developed for the global market. More generally, U.S. interests are multifold but not always pursued with coherent policies. Central Asia is a logistical hub for supplying NATO troops in Afghanistan. But America also has plans for a "new silk road," an economic integration of Central Asia with Afghanistan to help stabilize the latter. Another interest is solving the frozen conflict between Armenia and Azerbaijan, which are now are engaged in a rapid arms buildup. On another level, America views the three countries as standing at a crucial turning point in their development. It has considered, for example, policies that would aid education, training, language teaching, and other ways of improving human capital in these countries. Helping spread the English language here would provide a key medium for integration into the global community of trade, culture, and science/technology. This task force will: 1) analyze current political, economic, and social conditions in the three mentioned countries; 2) evaluate specific U.S. interests and policies in light of the mentioned analyses; 3) answer the question: how important are these countries to U.S. foreign policy and how important *should* they be; and 4) suggest improvements to these policies, which might involve amending, deleting, or replacing those currently in action.
Evaluator: Martha Olcott, Senior Associate, Russia and Eurasia Program, Carnegie Endowment

JSIS 495 F TTh 3.30-5.20 Stefanie Frease

The International Criminal Court: Assessing Mass Atrocity Crimes

Over the past 20 years substantial advancements have been made in prosecuting mass atrocity crimes committed during conflict. Beginning in 1993 the United Nations established an *ad hoc* Tribunal for the former Yugoslavia. In 1994 a similar court was established for Rwanda. Subsequently, hybrid tribunals were set-up for Sierra Leone, East Timor and Cambodia, among others, with the primary purpose of holding individuals, not states, accountable. In July 2002 the Rome Statute came into force, thereby establishing a permanent international court, the International Criminal Court in The Hague, The Netherlands. The court has jurisdiction to investigate and prosecute individuals on charges of war crimes, crimes against humanity, and genocide. Currently, there are seven situations within the Court's purview, namely Uganda, Democratic Republic of Congo, Sudan (relating to the Darfur region), Central Africa Republic, Kenya, Libya, and Ivory Coast. This Task Force will focus on three of the seven situations currently being examined by the International Criminal Court. Students will gain an understanding of the defining features or elements of war crimes, crimes against humanity, and genocide and then review publicly available documentation to determine, much as a grand jury does, whether the evidence supports the various charges and adequately reflects the scope and nature of the respective conflicts. Additionally, students will contact individuals knowledgeable about the conflicts to test their findings. The final product, targeted toward the International Criminal Court, will provide ground-truth and make recommendations on a variety of issues including gaps identified between crimes committed and charges already filed by the Office of the Prosecutor.

Evaluator: Kelly Askin, Senior Legal Officer, Open Society Justice Initiative

JSIS 495 G TTh 9.30-11.20 Nadine Fabbi and Joel Plouffe

Arctic Security in the 21st Century: Emerging Issues and Challenges

Climate change is having a dramatic impact on the Arctic. The Arctic Ocean sea ice is vanishing rapidly with sea ice levels reaching their lowest point on record in 2012. Thawing ice, warmer temperatures, and growing economic activities in the Arctic are creating new security issues that go beyond conventional notions of national (military) security and defense. 'Arctic change' challenges national and sub-national policymakers and actors to continue to widen the traditional approach to 'Arctic Security' and develop policies that correspond to emerging social, economic, and environmental problems in the north. For students of international studies, the transformations taking place in Alaska, the Canadian Arctic territories and Inuit regions, and other Arctic nation-states, provides an opportunity to identify, assess, and challenge the meanings of 'Arctic Security' in the 21st century. The task force team, including Inuit participants from Canada, will have the opportunity to write a policy report presenting new approaches to security integrating international relations theories, security studies concept,s and regional Inuit governance models. The dialogue between the Government of Québec and the Inuit of Nunavik in northern Québec will provide a point of focus for these concepts. Students will travel to Québec City and Ottawa (Jan 26-Feb 3) to meet with Inuit leaders, government officials, industry, Arctic embassies, and leading scholars in Arctic security.

Evaluator: Tony Penikett, former Premier of Yukon

JSIS 495 H MW 8.30-10.20 Adam Smith

Defense, Diplomacy, and Development: Making a '3D' Strategy Work in East Africa

This task force will issue its report to the President's National Security Council and will focus on United States policy in the East African region, with a particular emphasis on the role of the Department of Defense's African Command (AFRICOM). The East Africa region is of growing important to United States national security interests. Instability in Yemen and Somalia, the increasing activity of Al Qaeda in the Arabian Peninsula, and the activities of various gangs and warlords that have both taken advantage of

the lack of governance in the eastern part of the Democratic Republic of the Congo and spilled over from previous conflicts in Rwanda, Uganda, and Sudan have all contributed to increasing the national security threats coming from East Africa. In its analysis of how best to meet these threats, this task force will focus on two principle aspects of US policy: First, the intersection of defense, diplomacy and development; and the interagency cooperation required in maximizing our effectiveness in the East Africa region in these three areas of policy. The Department of Defense can play a critical role in increasing security in this region, but this must be done in concert with improving governance, infrastructure, health, education, rule of law, and other areas of policy necessary for a nation to provide for its people. How best can the US DoD work with the State Department and other US agencies to help move the region towards greater stability and prosperity? Second, the importance of capacity building in the region—the process of building relationships with nations in East Africa and then using a limited amount of US resources to increase the ability of those nations to maintain security, improve governance, enforce the rule of law, build better infrastructure and health care systems, etc. The US has had some success in building these types of relationships with Kenya, Ethiopia, and Uganda in particular, and the class will examine how to build on these exiting relationships and develop others as well.
Evaluator: TBD

JSIS 495 I MW 3.30-5.20 Jonathan Warren

Violence and Crime Reduction in Rio de Janeiro

In the buildup to the 2014 World Cup and 2016 Summer Olympics, billions of dollars are being invested in Rio de Janeiro by the federal, state and municipal governments. One objective of these investments is to attempt to reduce substantially the levels of thefts, muggings, and murders, which are higher than in many war zones. This task force will consider the interventions that would be advisable in a myriad of arenas—policing, urban design, education, infrastructure, transportation, and decision making—to make a significant dent in the crime rates in Rio de Janeiro. This represents a once in a lifetime opportunity to improve substantially the quality of life for cariocas and, if successful, could prove a model for effecting improvements in urban areas throughout the Americas that face similar problems.
Evaluator: TBD

Task Force 2013 | Student Handbook

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6. How Your Task Force is Evaluated

   A. Evaluation Day – Friday March 15th
   B. Who Is Your Evaluator?
   C. Your Task Force Report is Written for Your Evaluator
   D. Preparing for Your Evaluation
   E. The Two-Hour Final Evaluation
   F. The Task Force Dinner
   G. Your Final Grade

7. Five Tips on How to Make the Most of Task Force

8. One-Page Calendar of Key Deadlines, To-Do's, and Deliverables

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Task Force Contacts and Resources

Wolfram Latsch, Coordinator of the Task Force Program	latsch@uw.edu
Tamara Leonard, Associate Director, Center for Global Studies	tleonard@uw.edu
Jane Meyerding, Program Assistant, International Studies	mjane@uw.edu
Amanda Hornby, Undergraduate Instruction Coordinator, UW Libraries	hornbya@uw.edu

Task Force Resources

Task Force reports, posters, and final presentations from 2011 and 2012 as well as other information can be found online at

http://jsis.washington.edu/taskforce/

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2/14/13

1. Introduction: Why Task Force Matters To You – and To Us!

The International Studies Program at the Jackson School introduces students to international issues through rigorous coursework in a wide variety of disciplinary and cross-disciplinary settings. The Program seeks to equip its students with the conceptual and analytical tools and knowledge needed to help make sense of complex global issues and processes. We also recognize that many of our graduates will want to help shape the world that they have studied – and, for this, they will need to be effective advisers, researchers, or managers in the arenas of policy and advocacy. This recognition is the inspiration for one of our capstone projects, the Task Force, which all International Studies majors complete during the Winter quarter of their final year.

Task Force has been part of the International Studies major since 1981. The original format was modeled on the Presidential Commissions common in policymaking in the United States. In these U.S. Presidents appoint groups of experts to provide them with substantive policy recommendations based on rigorous research and evaluation. In recent years Task Forces have investigated a wide range of topics and provided recommendations to various branches and offices of the U.S. government – but also to international, multilateral, and non-governmental organizations.

Jackson School Task Forces consist of small groups of students, numbering between 12 and 18, who are tasked with investigating a real-world policy issue and producing a final report and practical policy recommendations. These recommendations are then evaluated by a visiting outside expert – typically a serving or retired high-ranking U.S. diplomat, policymaker, NGO leader, or prominent think tank member). Task Force students prepare and present a 2-hour oral briefing for their expert evaluator. The evaluator arrives for the briefing having read the final report. After the briefing the evaluator engages students in discussion and debate and provides feedback on content and presentation. All Task Forces are evaluated on the same day (Friday March 15th) and, later that same day, all Task Force students, instructors and evaluators gather for a formal dinner which offers more opportunities for professional conversations and connections.

Past generations of International Studies majors have greatly valued the opportunities and the challenges of working together in small groups with clear goals and tight deadlines – an environment intended to mimic the real-world activities and workplace experiences that our students will encounter upon graduation. Task Force quarter has been a unique, memorable and valuable experience for our majors for more than thirty years – and we hope that your own Task Force quarter in Winter 2013 will provide the same for you!

2. Why Task Force is Different from Any Other Class

A. You Have to Hit the Ground Running – on January 7th!

Your 2013 Winter quarter JSIS 495 is unlike any other class in the International Studies major. In a typical class the quarter will start off quite slowly with a gradual build-up towards midterms and finals, be they in-class exams or research papers. In other words, regular classes are typically back-loaded in terms of the distribution of effort and work (and stress!) during the quarter. The Task Force class, on the other hand, is heavily front-loaded: your work on organization, management, research and writing has to start immediately and intensively right at the beginning of the quarter. In fact, instructors will typically assign readings over the Winter break and ask students to come to the first class meeting prepared to help work out the content and structure of their Task Forces. It is important that you keep this in mind as you plan your Winter quarter. It is not uncommon for students to experience a lot of stress as they try to balance the demands of Task Force with the demand of other classes - especially during the month of February when everyone is trying to finalize their own contributions to the final report while peer-editing the writings of others and carrying out extra tasks such as editing, coordinating, creating the poster, or creating PowerPoint slides for the Task Force's final presentation to the evaluator on Task Force Evaluation Day – Friday, March 15th.

B. You Have to Complete your Report in Seven Weeks – by March 4th!

Yes, seven weeks – between the second week of Winter quarter and the end of the eighth week of the quarter. That's all the time a Task Force has to do the required research, to create multiple drafts of all the writing, to provide each other with feedback and comments – and to produce a final neat and copy-edited version of the report that can be sent and presented to a busy professional expert who is visiting Seattle and UW for the sole purpose of hearing your presentations. So, seven weeks is not the time you have to write your own contribution to the final report – it is the time you have to write your own contribution AND to help put all the contributions together AND to create a presentable final report for your Task Force as a whole. The to-do's and deadlines for all Task Forces, as outlined in the 2013 Task Force Calendar at the end of this handbook, are mandatory and immovable for everyone, including instructors and International Studies program staff.

C. Others Depend on You – and You Depend on Them!

Task Force is a group effort and a group project. You are not able to choose any of the other members of your Task Force – but you do have to work with them over the course of a very intense quarter in which all of you have other classes and other commitments. Task Forces are managed and coordinated largely by the students themselves, with guidance, advice and input from faculty instructors. This means that everybody has to work together and support each other in often stressful conditions as the final (and immovable) deadline for the final report rapidly approaches. Free riders and shirkers are a serious threat to any Task Force, as are any students who are unwilling or unable to create time in their schedules for the many different jobs and assignments required to make Task Force work. Everybody's experience (and grade!) suffers if anyone refuses to pull their weight.

D. The Final Report is One Big Collaborative Project – and You Have to Help!

Your Task Force works together to create one comprehensive final report. The final report contains research and policy recommendations from all the students in the group. It is typically between 200 and 300 pages long, depending on the length of the individual contributions. A final Task Force report consists of the chapters produced by individual students, plus the executive summary, an introduction and a conclusion, and a comprehensive bibliography. Students do all the writing and editing and reviewing and proof-reading, and turn it into a professional-looking report that is submitted to an external evaluator with deep experience of the topic. Unlike in most other classes your own contribution does not stand alone; it has to fit into the overall report which you have to help create.

3. The Organization of Your Task Force – and Your Role In It

Different people have different roles in your Task Force. And that includes you! You are not just a student dropped into a class: you are an active participant in creating the organizational structure of your Task Force – and making it work!

Below you will find a list and descriptions of the different positions and jobs and groups that make up a Task Force. For students these roles are not all mutually exclusive – actual arrangements and assignments will depend on decisions made by your particular Task

Force team and your instructor. But, apart from the instructor's role, all of these jobs will have to get done – by you and your fellow Task Force members!

A. The Instructor

Your Task Force instructor is a member of the UW faculty – he or she might be a full-time faculty member or an affiliate professor appointed to lead a Task Force. Your instructor created the topic of your Task Force based on their own interests, background and expertise. He or she will provide you and the other Task Force students with substantive guidance on the Task Force topic, research sources and resources, and the policy context. Your instructor will assign readings and tasks to you which you will complete over Winter break. They might spend a class or two at the beginning of Winter quarter providing you with essential background knowledge and will otherwise be available during and outside class meetings to give advice and feedback on the research you are doing for your contribution to the final report. Your instructor will also help you create the structure of the final report, provide guidance on its content, connect you with experts, and help get the group ready for its final presentation to the outside evaluator (who was identified by your instructor.)

B. The Coordinator and the Editor

Most Task Forces appoint a team of two students to carry out the jobs of coordinating and editing. The team can share both tasks, or divide them up – and this choice is left to individual Task Forces to decide. Read this section carefully to see if you are interested in one of these positions – they will need to be filled very quickly, in the first week of Winter quarter (i.e. by January 11th at the latest!) These positions are absolutely essential to the smooth and effective running of the Task Force. They are not vanity positions! If you enjoy, and are good at, managing a project or editing the writings of others then you may be a good fit for one of these positions. Both require an even temper and a lot of dedication and good will! Your instructor will determine the process by which the editor/coordinator team is appointed.

Being an editor or coordinator does not mean that you have no writing of your own to do: in most Task Forces the editor/coordinator team is also responsible for the final report's executive summary, introduction, and conclusion – all of which are typically written right before the final report goes to print.

The coordinator acts as a kind of project manager who oversees the overall workflow of the Task Force and is essential in enforcing deadlines and tracking individual contributions and overall progress. The coordinator typically creates a calendar of tasks based on the common to-do's and deadlines outlined in the Task Force Calendar, manages and enforces internal deadlines for drafts, peer-editing (students reading and editing each other's work), and any meetings outside of class time. The coordinator is also a liaison between the students and the instructor and between the Task Force and International Studies program staff. In this capacity the coordinator collects and passes on any required information about copyright, meal preferences for the formal dinner on March 15th, or the printing of the final report.

The editor is essential in ensuring that the final Task Force report is of high and even quality. This involves providing continuous feedback to individual students on their contributions, enforcing a uniform citation system and style, managing the peer-editing process, and integrating all the individual contributions in the final report. In doing all this, editors will have access to the advice and guidance of professionals at the UW Libraries and the Odegaard Writing Center. A special drop-in session for editors and coordinators will be provided by UW librarians.

C. Sub-Groups within Your Task Force

At the beginning of Winter quarter most Task Forces create sub-groups of students working on similar or related areas within the Task Force's overall topic. For example, there might be three sub-groups looking at the impact of an issue on three different regions or countries, or separate groups exploring different aspects of the same problem. These small sub-groups can more easily peer-edit each other's work, under the guidance of the Task Force's overall editor. Creating sub-groups can help make Task Forces more manageable, and allow students to cooperate more closely based on their interests and backgrounds.

D. Individual Task Force Members

If you are not an editor or a coordinator then you will be contributing your own chapter or section to the final Task Force report – typically as part of a sub-group of three or four students. Chapters and sections (and therefore groups) are usually defined and assigned at the beginning of the Winter quarter based on the interests and backgrounds of individual students and on the overall vision and goals of the report as developed between the

instructor and the students. Task Forces have some latitude in determining their division of labor and the length and nature of individual contributions – but, typically, you will be responsible for a written section of about 15-20 pages in length. You will carry out the research for your chapter, locating and managing your sources and references in a neat bibliography compiled according to your Task Force's chosen citation style (for example MLA or Chicago.) You will write and rewrite and edit as you receive feedback from the instructor, the editor, or other students in your group. You will make sure that your contribution meshes and fits well with all the others as the final report is compiled, making adjustments and changes as needed and as advised. You will have to keep an eye on deadlines and make sure you do not jeopardize your group's collective efforts to produce a presentable report free of plagiarism, typos, and errors. You will keep in mind that you are writing not for your instructor but for an evaluator with considerable professional experience who will judge your group's report on its academic and professional merits.

In addition you will be asked to create content for your Task Force's final briefing – which is typically a PowerPoint presentation. You will have to create a slide (or slides) with your own key findings and recommendations.

Two special assignments are available to students who are willing – and feel able – to carry them out. Both of these assignments give you the opportunity to present the work – and convey the process – of your Task Force to a broader audience on Evaluation Day. This audience may include students in other Task Forces, other instructors, and other evaluators. Both of these assignments have to be combined with the normal workload of research and writing.

> The Poster Team: the findings and recommendations of your Task Force are presented on a poster that will be on display at the formal dinner on Friday, March 15th. A small group of students will work on condensing the report for presentation on the poster in a visually effective and appealing way – a challenging task!
>
> The Dinner Speaker: one student from each of the eight Task Forces will speak during the formal dinner on Friday March 15th, briefly introducing their group and talking about the work of their Task Force, in an informal mood, for about three minutes.

4. Getting Ready for Task Force: Fall Quarter and Winter Break

A. Deadlines!

The most important aspect of Task Force to keep in mind is DEADLINES.

In other classes instructors might give you extensions or cut you some slack. In Task Force there is no slack to cut. All Task Forces are evaluated on the same day – on Friday, March 15th – and Evaluation Day ends with a formal dinner for all students, instructors and evaluators. Final reports have to be delivered to program staff (who overnight the hardcopy to evaluators) by noon on Friday, March 8th. Since it takes time to produce a presentable and readable and neat and professional-looking report, and it will need to be printed…

…you have a total of SEVEN WEEKS to do ALL the research, writing, editing, rewriting, formatting…

…after which you have about two weeks to prepare and rehearse your final presentation which should look professional (as should you!), with a clear and informative slide presentation and a concise script.

This 'Seven Week Clock' starts ticking at the beginning of the second week of Winter quarter – on Monday, January 14th – since the first week of the quarter is dedicated to determining the direction and structure of the final report.

So it is important that all the Task Forces (and you!) hit the ground running on the first meeting of your Task Force (which will be on Monday, January 7th or Tuesday, January 8th, depending on your class times) so that research and writing can start as quickly as possible.

To drive this home, here are the key dates to keep in mind:

First Meeting of Task Forces:
Monday January 7th or Tuesday January 8th
Beginning of 'Seven Week' Period for Research, Writing, and Editing:
Monday, January 14th
End of 'Seven Week' Period for Research, Writing, and Editing – The Final Version of Task Force Report Goes To Print:
Monday, March 4th
Evaluation Day (Presentation to Evaluator and Task Force Dinner):
Friday, March 15th

To make all this happen the run-up to Task Forces begins in Fall quarter.

B. Choosing your Task Force

Around the beginning of Fall quarter 2012 you will receive information about the topics of all the 2013 Task Forces, with short descriptions, along with an online Catalyst WebQ survey asking you to rank the available Task Forces according to your preferences. This will help Linda Iltis in JSIS Students Services assign you to a particular Task Force.

C. The Policy Memo Workshop in Fall

Your own contribution to your Task Force's final report will combine academic research and writing with policy writing. Policy writing means writing for an audience of decision-makers: you are providing background for a set of recommendations that will help others make a decision. In the "real world" this often means producing a very short policy briefing in the style of a memorandum (or "memo") – which might not be longer than one page. Developing this skill is important for professional work in a wide variety of settings – in policymaking, consultancy, or in the corporate and the non-profit worlds. After graduation most of you will not be spending much time writing 25-page research papers but almost all of you will be asked to provide very clear and concisely written input that synthesizes a large amount of literature or data or research for someone else's practical use in guiding an important decision or choice (and one day YOU may be that 'someone else'!)

In your Task Force you will typically be asked to preface your chapter with a very brief summary which condenses and digests your chapter's main points and findings. The final report must be prefaced by an overall Executive Summary which you may be asked to write (if you are an editor) or to help write or edit. This requires the ability to write in a style that is concentrated, clear, crisp and concise.

To this end you are required to register for, attend and complete a two-part Policy Memo Workshop in Fall quarter 2012 (JSIS 478 M, 1 cr. C/NC.) The workshop consists of two class meetings (you have a choice of dates and times) and is led by Philip Wall, a retired senior U.S. diplomat and affiliate professor in the Jackson School. In the workshop you will learn about the writing of policy memos and executive summaries and you will practice this by writing your own memo (based on a set of readings on a current policy issue) and having it read and critiqued by Professor Wall.

> Policy Memo Workshop | Fall 2012 | JSIS 478 M | Dates and Times:
>
> Workshop Part I: EITHER on Monday October 15th, 4:30 pm to 6:20 pm OR on Tuesday October 16th, 5:30 pm to 7:20 pm.
>
> Workshop Part II: EITHER on Monday November 26th, 4:30 pm to 6:20 pm, OR on Tuesday November 27th, 5:30 pm to 7:20 pm.

NOTE: Professor Wall has also taught classes on Negotiations (SIS 490 J) and American Foreign Policy (SIS 423): if you have taken any of these two classes you will NOT have to attend the Policy Memo Workshop.

D. Readings and Assignments During Winter Break

Most students are unfamiliar with the topics they will be researching and reporting on in their Task Forces. To make sure everybody starts from a similar baseline your instructor will assign readings for you to complete by the first day of Winter classes (typically over Winter break). Your instructor may also ask you to prepare a preliminary written work based on the readings. Your instructor will be in touch with you before the end of Fall quarter with details. Some instructors may want to meet with their Task Forces before the end of Fall quarter. In any case, be ready and make time to do some preparatory work for your Task Force before Winter quarter begins.

5. Managing Your Task Force Quarter: To-Do's, Deadlines, and Deliverables

A. The First Meetings of Your Task Force

Winter quarter has finally arrived and you have your first official meeting with your instructor and the other members of your Task Force – either on the Monday or the Tuesday of the first week of the quarter (January 7th or January 8th). Do not arrive on campus late for Winter quarter! Work on Task Force begins right away and you are part of a team. You have to come to the first class meeting prepared and ready to sign up for tasks and jobs!

ThefirstfewmeetingsofyourTaskForceshouldbededicatedto:

Defining and delineating the scope of the final report, keeping in mind who the report is being written for
Defining the building blocks of the final report, including the scope and content of individual chapters and report sections (groupings of individual chapters)
Selecting and appointing the editor and coordinator from among the students
Creating a timeline, and understanding and reinforcing important deadlines
Creating tools and procedures to manage the Task Force and the communication between members (typically UW Catalyst tools such as GoPost, ShareSpaces, WebQ etc.)

Doing all this work effectively in the first week of the quarter means that research and writing can begin in the second week of the quarter (the week of January 14th): that's when the clock for the seven-week research/writing/editing phase of the Task Force starts to tick.

B. The UW Libraries Workshop

Every year we work with the staff at the UW Libraries to create a series of workshops to help students get started on the research they will need to do for their reports. The relevant subject librarians create a tailor-made workshop for each Task Force. In your workshop you will be introduced to your subject librarians and to the tools you need to work effectively on your specific topic. There is a dedicated UW Libraries page for each of the eight Task Forces which is a portal to a wide variety of sources and resources. Getting

to know your subject librarian is essential: they are a great resource when you need to do a lot of research under time pressure. UW has one of the best library systems in the country – make the most of its people and resources!

Your Task Force's workshop will take place at the beginning of Winter quarter – during one of the first four class meetings. The workshops take place in the Suzzallo or Allen Libraries and we will let you know on what day and where your workshop takes place.

C. Doing Your Own Research and Writing

Task Force is a collective effort. This means that your own topic and your own research and writing have to fit into the overall structure of your Task Force's final report. The editor and coordinator are tasked with managing the process and helping you ensure that all the pieces fit together. But it is your responsibility to carry out your own research and writing diligently, carefully and thoroughly so that the final report is of a high and consistent quality.

To be effective you will start by carrying out a survey of the relevant sources and information for your topic – a literature review. You cannot write a policy-relevant paper without showing that you know what you are writing about. For your chapter to inspire confidence you will have to demonstrate to your audience (your evaluator) that your information is relevant, authoritative, and up-to-date. Otherwise your policy recommendations and advice cannot be taken seriously.

<u>Hereareafewessentialtips:</u>

- Look at past Task Force reports which are available online via the JSIS International Studies page and in hardcopy in the JSIS Student Services office (THO 111)
- Use the links and databases available to you from your Task Force's resource page (created for your Task Force by a UW Librarian) to get started
- Talk to your instructor about the scope of your chapter and about essential sources
- Talk to your subject librarian for additional guidance on sources
- Coordinate and work with other members of your group (especially those working on related sub-topics) to share important sources and information
- Maintain a clean and neat bibliography of the sources you consult, and maintain it in the citation format your Task Force has chosen so that it can easily be incorporated into the final report's overall bibliography – and used by others if necessary

Maintain good and clear research notes…so you don't have to go back and re-take any notes or re-check any bibliographic information

Maintain good and clear research notes…so you don't inadvertently commit plagiarism by failing to distinguish between other authors' quotes and your own writing. Be wary of cutting and pasting!

Look for good and helpful and up-to-date visual information, such as graphs, charts and maps, which will help bring your chapter to life and can save you a lot of descriptive writing

Keep track of where you found your information – you will need to sign a copyright form to ensure that you are using this information ethically

Think about ways of creating your own visual information (tables, charts etc.) – it can be a very effective and efficient way of summarizing and presenting information. If you are good at this offer your help to others; otherwise find out who in your Task Force has some experience with this or skill in this area

D. Writing, Editing… and Re-Writing… and Editing Again…

Your chapter (and with it the final report) will evolve and develop over the course of the 'Seven Weeks' as you write and re-write a number of drafts. You will typically produce three or four drafts before the final version of your contribution goes into the final report.

Since everybody is doing this there is a lot of editing to do in a short time. Editors cannot do all this work by themselves – so they will ask small groups of students to peer-edit and review each other's drafts. Instructors will also help. The editor and the coordinator will create and maintain a timeline and schedule for producing and submitting drafts so that the process is synchronized – and a platform (such as Catalyst ShareSpaces and/or Google Docs) for doing this so that drafts can be submitted and picked up online and everyone can work on the report from different locations and at different times.

Be aware that there will be many bursts of intense writing, reading and editing. You will meet with others outside of your regular Task Force class times to review and discuss progress. It can be stressful at times because the deadline is drawing near and there are other things you have to do in your life. But you will need to prioritize Task Force because it is a team effort. You will need to get along with others or the whole project is in jeopardy.

E. Creating Your Own Policy Recommendations

When everyone has completed their final drafts your Task Force will have to produce its overall set of policy recommendations. They are typically part of a concluding section which the editor will oversee and write. This section is of course key to your report and your evaluator may well read that part first!

The policy recommendations should be few, clear, concise, and evidence-based – and they should give direction on actual steps that might be taken. Recommendations have to be backed up by the material that you presented and discussed in the individual chapters and sections. All Task Force members have to agree to these policy recommendations; achieving this consensus will typically involve some discussion and debate during a class meeting. Your policy recommendations should be clearly prioritized and sequenced and reflect your awareness of constraints. Decision-makers have scarce resources and may need to do just a few things – simply producing a long 'laundry list' of recommendations undermines the usefulness of your report.

Remember that your evaluator is a policy professional with considerable experience in the "real world." Don't just give them a list of nice-sounding platitudes of the 'motherhood and apple pie' variety ("Persuade warring factions that peace is in their best interest") or completely unrealistic 'pie-in-the-sky' recommendations ("Immediately lower international carbon emissions by 50% to prevent sea level rise")

F. Creating the Final Report

Eventually the editor and coordinator will ask for your final-final draft in a standardized format (fonts for main text, headings and sub-headings, font size, citation style, margins) which will then be merged with all the other contributions and the surrounding sections (introduction, conclusion/policy recommendations, and the executive summer). Pagination will have to be checked, spelling and grammar will have to be checked, visual information will have to be put in the right places and properly referenced, the bibliographies will have to be checked (and in many cases merged to create a single section of references.) The final report will then have to be taken to the Copy Center (in the basement of Communications) by Monday, March 4th.

The editor and coordinator will need help with all this. Be ready to step in and take responsibility during this crucial phase when the submission deadline is just a few days away!

G. The Task Force Poster

Early in the Winter quarter you will receive a PowerPoint template which you will use to create a poster for your Task Force. Each Task Force will create such a poster, representing its topic and highlighting its policy recommendations. Creating the poster is a useful part of the Task Force learning process because it requires you to distill the key findings of your research; it also gives you the experience of creating the kind and quality of poster suitable for an academic or professional conference. This distillation will provide a framework for your presentation at the evaluation session. The Jackson School also encourages Task Force students to submit their poster to the annual Mary Gates Undergraduate Research Symposium, to be held in the spring.

If you enjoy creating a visual representation of your groups' work then you should join your Task Force's 'poster team' and, using the information from the final report, help create your group's poster – by around Monday March 4th (the poster will be printed at the Copy Center in COMM.)

All the Task Force posters will be on display at the formal dinner on Evaluation Day (Friday March 15th.) Some posters from past years can be viewed along the staircase to the fifth floor of Thomson Hall – check them out for insights and inspirations. Additional posters are kept in THO 502 and can be viewed on request by contacting Tamara Leonard (tleonard@uw.edu).

6. How Your Task Force is Evaluated

Your completed Task Force report is expedited to your evaluator about one week before Evaluation Day (which is on Friday, March 15th, the last day of Winter quarter classes.) This gives your external evaluator time to read and digest the report and its findings – and to formulate questions and comments to put to you during the formal oral evaluation. This section will tell you more about the evaluation process and about the things that happen on Evaluation Day.

A. Evaluation Day – Friday March 15th

You must make sure you are available on Evaluation Day – all day! Your Task Force will be given a two-hour time slot during which you will present to your evaluator. Evaluations may start as early as 9 am and end as late as 5.30 pm, depending on room availability. The evaluation will happen on campus in a room that looks and feels professional: last year, evaluations took place in Paccar Hall, the Burke Museum, Thomson 317, and Mary Gates Hall. You or other members of your Task Force will be involved in hosting your evaluator which may involve escorting them to and from their hotel and between appointments such as the evaluator luncheon, the evaluation session, and the formal dinner. The formal dinner is typically at the University of Washington Club (near Hall Health); it begins around 6 pm and ends around 9:30 pm and includes all instructors, evaluators and students, and other Jackson School program faculty and staff. The formal dinner is part of the professional experience of Task Force: you are expected to dress nicely and comport yourself in a professional and presentable way that shows you, your Task Force, and the School in the best possible light!

B. Who Is Your Evaluator?

Your evaluator is an experienced professional who works in the field or in the region defined by your Task Force's topic and 'brief'. Many past evaluators have been retired diplomats or senior government officials (who may have some experience of universities and academic research), or senior members of NGOs and advocacy organizations. Your instructor will identify the appropriate evaluator, and evaluators from recent years include:

Ryan Crocker, former U.S. ambassador to Iraq, Afghanistan and Pakistan

Erin Conaton, U.S. Under Secretary of the Air Force

Krist Novoselic, co-founder and bassist of Nirvana and chair of FairVote

Donna Hopkins, Coordinator for Counter-Piracy and Maritime Security, U.S. Department of State

Bates Gill, Director, Stockholm International Peace Research Institute (SIPRI)

Rebecca Lent, Director, Office of International Affairs, National Oceanic and Atmospheric Administration (NOAA)

You will know early in Winter quarter who your evaluator is. This will help you focus your research and writing.

C. Your Task Force Report is Written for Your Evaluator

In most of your classes you produce written reports or papers for your instructor, or for your TA (who reads and grades on your instructor's behalf.) In your Task Force you are writing for your external evaluator. Task Force research and Task Force final reports are directed at a notional or actual client who will use the report for practical purposes. There are two possible formats for this, and your Task Force will use one of them:

> The final report can be written for a branch or organization in the U.S. government (e.g. the White House, or the EPA, or the DoD) to inform and influence the U.S. policymaking process. In this case your evaluator will have some experience of that organization or be familiar with its workings as a policy or think-tank professional - for example as a senior diplomat, a member of Congress, or a government official (who might be retired.)
>
> The report can be written for an organization that is <u>not</u> part of the U.S. government, such as a multilateral institution, a corporation, an NGO or international NGO, or a foreign government. For this type of Task Force the client organization is involved during the preparation and execution of the Task Force, and your evaluator will be a senior representative of that client organization. Examples of this in recent years include a Task Force reporting to the International Budget Project (on accountable and transparent budgeting in poor countries) and a Task Force reporting to the advocacy group FairVote (on electoral reform in Washington state); in both cases senior members of those organizations evaluated the Task Force reports and the format of the report was tailored to the practical needs of those organizations.

D. Preparing for Your Evaluation

Between the completion of your final report and Evaluation Day your will be involved in preparing for your evaluation. Under the guidance of the instructor and your editor/coordinator team you will create slides for a professional-looking PowerPoint presentation. You will also rehearse (typically twice) the entire presentation so you can be confident that it is effective and flows smoothly on the day. Every student should have a very short script ready, and preferably memorized, for their part of the presentation. Most

Task Forces decide to give every student a speaking slot during the evaluation – so you will have to create one very clear and concise PowerPoint slide for your own contribution and make sure the format and length are comparable to those prepared by other students.

E. The Two-Hour Final Evaluation

Each student's contribution will have to be very short to allow enough time for Q&A with your evaluator; if you have sixteen students in your group each student can speak for only about three minutes! Making a very brief presentation is a challenge, and rehearsals will help you get it right. Most Task Forces make a presentation of (at most) one hour's length to the evaluator and leave one hour for questions, comments and feedback. Hearing from your evaluator is the key part of the evaluation: your evaluator may direct questions at individual students, ask for clarification, and provide constructive criticism of any part of your report – especially the recommendations. The atmosphere is professional but courteous; it is neither confrontational nor hostile! Your evaluator has read your report and will listen to your presentation as they would in their professional lives, and treat you as they would treat another professional. They have not met you before and do not know you except through your contribution to the report and the evaluation. The quality of the content and the presentation are therefore essential, and preparing it thoroughly is well worth the effort. You should see the final evaluation as an opportunity to develop and sharpen the kinds of skills you will need in your own professional life: speaking clearly and confidently, taking responsibility for your work, building your professional relationships, and being willing to learn from others who have more experience than you do.

F. The Task Force Dinner

After your final evaluation, in the evening of Friday, March 15th, comes the formal Task Force Dinner. The dinner is a professional social event, and attendance is required for all students. You will dress smartly and behave professionally. You will be seated at a table with your own Task Force – including the instructor and the evaluator, and any guests they might bring. You will enjoy food, drink, and an opportunity to reflect and talk about the challenges and successes of the past quarter. There will be opening remarks by the director of the School and the chair of the I.S. program, and a keynote address by one of the evaluators. During dinner, one student from each of the Task Forces will briefly talk about and showcase their group with some informal and light-hearted impressions of what their

TF did and how the work went; this is also an opportunity to thank the instructor and evaluator.

It is important that you do not treat the dinner as an opportunity to let your hair down and party – you are free to do this after the dinner is over and you move to other, more casual venues! Please note that there will be no alcohol served to students at the dinner – and that you are not allowed to bring any alcohol of your own.

G. Your Final Grade

Final grades are awarded by the instructor, as in any other course. Your instructor will let you know about the specific criteria they will use to grade you and the other students in your Task Force. In general, though, your overall course grade in JSIS 495 will reflect your participation in the Task Force process as well as your contribution to the final report and the final evaluation. Instructors will use the evaluators' feedback and comments in creating the students' grades, taking into account any special efforts or contributions that individual students have made over the course of the quarter. Doing well in Task Force means more than just producing good research and writing: your Task Force is effective and works well only if everyone as also a 'good citizen', contributing more than just their own chapter. Instructors know this and use the grading scheme to reinforce it and provide incentives not just for rigorous and conscientious work, but for good citizenship.

7. How to Make the Most of Task Force: Five Tips

1. In Winter quarter, budget and manage your time in a smart way. Task Force has to take priority over other classes and commitments since it is a team effort and other people depend on you (even more so if you decide to become a coordinator or an editor in your group.)

2. Don't just do the minimum. Be a good citizen in your group and stand ready to help out with any jobs that have to be done – especially during 'crunch time' when the final report is being assembled from all the individual contributions; a lot of this work will have to be done during week eight of the quarter (Feb 25-Mar 1)

3. Accept and enjoy the challenge of working on a topic that is outside your comfort zone. Not everybody is assigned to their top-ranked Task Force – and even if you are you

may be asked to work on a topic that is new or unfamiliar to you, or that you did not think you were that interested in. That's life! You will often face challenges like that in your professional career, so try to roll with it. Many Task Force students have found that doing good research and writing in a dedicated group of peers is its own reward – and many issues become interesting and important once you start working on them.

4. Take Pride in Producing a Good Report. Task Force reports are published electronically by the UW Libraries, so future students will consult them before they take their own Task Forces. Your evaluator will give your report the scrutiny they would apply to any professional report. These are two good reasons for trying your best to create a professional product of high quality and lasting value.

5. Create Strong Academic and Professional Connections. Task Force is a great opportunity to make a strong and lasting impression on your instructor and on your evaluator. During Task Force instructors get to know their students' abilities and potential very well indeed – something that can result in a strong, personal and convincing letter of recommendation in the future. Many students have been able to strike up helpful and useful relationships with their evaluators through the final presentations and conversations on Evaluation Day. There are many opportunities for networking in Task Force, more than in most of your other classes.

8. One-Page Calendar of Key Deadlines, To-Do's, and Deliverables

On the following page you will find a concise calendar for the Task Forces in Winter quarter 2013. There may be small changes in dates but all the deadlines are fixed and immovable!

Keytoabbreviations:

TF = Task Force

JM = Jane Meyerding | THO 419 | mjane@uw.edu

TL = Tamara Leonard | THO 502 | tleonard@uw.edu

A–4.4/202-13
2/14/13

Task Force 2013 | Winter Quarter Calendar with To-Do's, Deadlines and Deliverables

Week	*Dates*	*To-Do's, Deadlines and Deliverables*
1	Jan 7-Jan 11	UW Libraries - Research and Writing Workshops Appoint Editors/Coordinators; define and assign format and chapters • Appoint Poster Team
2	Jan 14-Jan 18	• UW Libraries - Research and Writing Workshops • Make sure all students are available on **Mar 15** for evaluation and dinner
3	Jan 21-Jan 25	
4	Jan 28-Feb 1	
5	Feb 4-Feb 8	• Sign copyright permission form and give to JM • You will receive room assignment for evaluation • Poster team: be familiar with poster format
6	Feb 11-Feb 15	• **Copy Center: check deadline for submitting MS in time for Mar 8 binding** • Give exact title of TF Report to JM • Poster team: design poster (graphics etc.) • Dinner prep: collect entrée choices + check for $10 per student to JM
7	Feb 18-Feb 22	• Take class photo for poster • Determine time for evaluation "dry run" in week 10, arrange for room
8	Feb 25-Mar 1	• by Mar 1: send name of your TF's dinner presenter to JM • mid-to-end-of week: final versions of chapters to editors/coordinators • collation and merging of individual chapters, formatting final report MS
9	Mar 4-Mar 8	• Instructors review final version of poster by Mar 7: final version of poster to Copy Center for printing **by Mar 4: deliver report manuscript to copy center** by 12 noon on Mar 8: give hardcopy of evaluator's TF report to JM
10	Mar 11-Mar 15	Practice evaluations with PowerPoint presentation by Mar 14: bring printed poster to TL - by Mar 15: give complete PDF version of TF report to JM **FRIDAY MARCH 15th** Two-hour evaluation of TFs by outside evaluators Dinner 6-9 pm, UW Club (business/professional attire)

Research, writing and editing period

SEVEN WEEKS

Enjoy your Task Force Experience!

Acknowledgements

The Task Force Program gratefully acknowledges the support and assistance of the following donors and entities:

Hellmann Fund for Innovation and Excellence in International Studies

International Studies Program Discretionary Fund

Maxwell M. and Julia Fisher Endowment

Title VI, International and Foreign Language Education, Office of Postsecondary Education, U.S. Department of Education

Center for Global Studies, UW

The Henry M. Jackson School of International Studies, UW

A–4.4/202-13
2/14/13

Indonesia Task Force 2012

Universitas Indonesia
University of Washington

Henry M. Jackson School of International Studies

Universitas Indonesia
University of Washington
The Henry M. Jackson School of International Studies

Faculty Advisers
Professor Suraya Afiff, Universitas Indonesia
Professor Celia Lowe, University of Washington

Interviews and Field Work in Indonesia
December 29, 2011- January 13, 2012
Trip Report

The facilitation of our research trip to Indonesia was made possible by the contributions of:

- Center for Global Studies
- The Hellman Fund for Innovation and Excellence in International Studies
- The Henry M. Jackson School of International Studies
- International and Foreign Language Office of Postsecondary Education
- International Studies Program Discretionary Fund
- Maurice D. and Lois Schwartz Endowment for International Education
- Maxwell M. and Julia Fisher Endowment
- Office of Global Affairs
- US Department of Education

In the Henry M. Jackson School of International Studies, we would like to thank:

- Sara Curran, Director, Center for Global Studies
- Wolfram Latsch, Associate Chair of the International Studies Program
- Tamara Leonard, Associate Director, Center for Global Studies
- Jane Meyerding, Program Coordinator, Center for Global Studies

The 2012 Indonesia Task Force has been a remarkable journey, bringing together students from the Universitas Indonesia and the University of Washington to study deforestation and environmental policy in Indonesia. Most undergraduate students in the Jackson School and the University never have the opportunity to participate in real fieldwork. While many undergraduates have research experiences, most are limited to library resources and applications of scholarly theory. Our research on Reducing Emissions from Deforestation and Forest Degradation in Indonesia was an invaluable introduction to real, on the ground research. Our work was comprised of interviews with stakeholders at all levels of policy-making. Instead of reading formal documents and reports to inform our analysis of REDD+, we were able to gather first hand information from various parties involved, including presidential aids, government bureaucrats, NGO and private company executives and local people on the ground. By asking our research questions directly to the very actors involved, we were able to get a true sense of REDD+ and it's implications for the region. These interviews were real, the information was real, and we believe that the understanding gained would simply not have been possible without this first hand experience.

More importantly, however, the aspect of our Task Force that contributed most to such a positive learning experience was that we conducted our research and writing through a collaborative process. During our research, at the beginning of each interview, we would describe our group and our mission.

"This research group is unique because it is the first collaborative task force of its kind. This project is a working partnership between the Universitas Indonesia and the University of Washington, to understand the REDD+ program in Indonesia."

In every interview, we introduced ourselves in this way, stressing the unity of our international team. We described our group in this way because, the collaborative aspect of this research experience has been deeply rewarding, creating bonds of friendship and scholarship of which we are incredibly proud. We each brought different knowledge, backgrounds and disciplinary perspectives to our work, giving our report a broad perspective. As one, bilateral team, we were able to have fascinating discussions, challenging each other to grow our understanding and encouraging new perspectives and methods of analysis.

We cannot adequately express our gratitude to all of the individuals who made this experience possible. Many thanks to our professors, mentors, and other individuals who arranged every aspect of our wonderful stay in Indonesia and organized an incredible line-up of interviews and research opportunities. We have each learned a tremendous amount in an incredibly short period of time, and we owe our depth of understanding to you. Thank you, also, to our sponsors and everyone behind the scenes who invested in our experience.

Terima kasih!
Thank you!

The UI-UW Task Force

Indonesia Hosts
Departments/ Organizations/Embassies

- Center for International Forestry Research (CIFOR)
- *Dewan Nasional Perubahan Iklim* (National Council on Climate Change, DNPI)
- Epistema Institute
- Flora and Fauna International (FFI)
- Forestry Research and Development Agency (FORDA)
- Greenpeace
- Aliansi Masyarakat Adat Nusantara (Alliance of Indigenous Peoples in the Archipelago, AMAN)
- Kemitraan
- Rimbawan Muda Indonesia (Indonesian Institute for Forest and Environment, RMI)
- Rimba Makmur Utama (RMU)
- The Royal Norwegian Embassy
- The Samdhana Institute
- Satuan Tugas REDD+ (REDD+ National Task Force, Satgas REDD+)
- UN-REDD Programme Indonesia
- USAID-Indonesian Forest and Climate Support
- Wahana Lingkungan Hidup Indonesia (Indonesia Forum for the Environment, WALHI)

Indonesia Schedule
December 29, 2011- January 13, 2012

Thursday, December 29
UW students arrive in Indonesia
Travel from Jakarta to Bogor

Friday, December 30
Hiking excursion to waterfalls at Taman Nasional Gunung Gede Pangrango

Saturday, December 31
Bogor Botanical Garden
Wayang Performance

Sunday, January 1
Travel from Bogor to Jakarta
Visit to Mesjid Istiqlal
Meeting with Universitas Indonesia research team

Monday, January 2
Opening workshop at the Universitas Indonesia

Tuesday, January 3
Satuan Tugas REDD+ (REDD+ National Task Force, Satgas REDD+)
*Aliansi Masyarakat Adat Nusantara (*Alliance of Indigenous Peoples in the Archipelago, AMAN)

Wednesday, January 4
Dewan Nasional Perubahan Iklim (The National Council on Climate Change, DNPI)
The Royal Norwegian Embassy
Wahana Lingkungan Hidup Indonesia (Indonesian Forum for the Environment, WALHI)

Thursday, January 5
UN-REDD Programme Indonesia
Flora and Fauna International (FFI)
Rimba Makmur Utama (RMU)

Friday, January 6
Rimbawan Muda Indonesia (Indonesia Institute for Forest and Environment, RMI)
Nyuncung Village Stay

Saturday, January 7
Nyungcung Village Stay

Sunday, January 8
Travel back to Jakarta

Monday, January 9
Unired States Agency for International Development (USAID)
Epistema Institute

Tuesday, January 10
Samdhana Institute
Greenpeace

Wednesday, January 11
Travel from Jakarta to Bogor
Center for International Forestry Research (CIFOR)
Forestry Research and Development Agency (FORDA)

Thursday, January 12
Task Force Workshop in Bogor

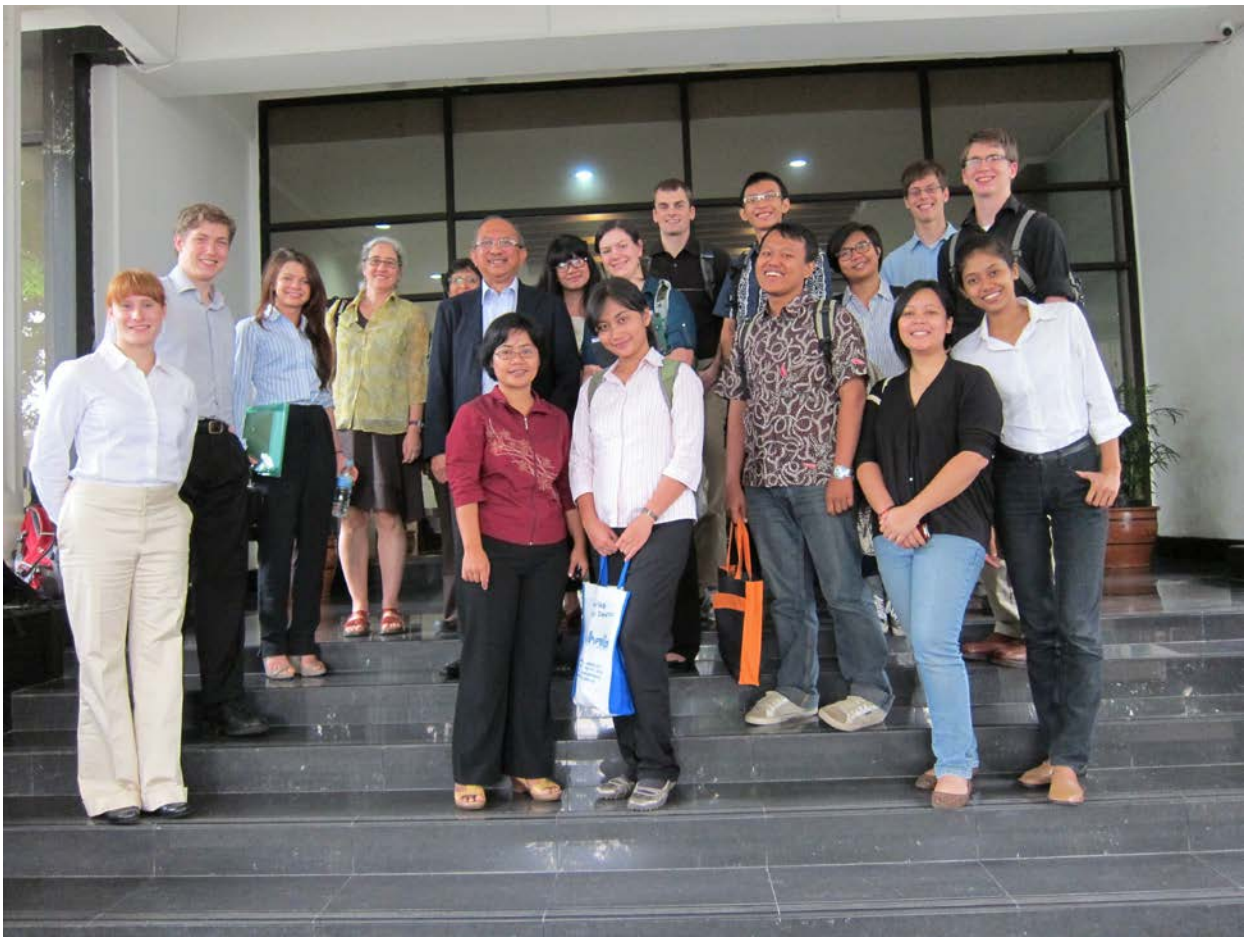
Friday, January 13
Travel from Bogor to Jakarta
UW students return to Seattle

Indonesia Hosts
Speakers/ Hosts/ Coordinators

- **Dr. Mubariq Ahmad**, Senior Consultant/Advisor on Climate Change Policy, World Bank
- **Mr. Patrick Anderson,** Fellow, Samdhana Institute
- **Ibu Laksmi Banowati**, National Project Manager, UN-REDD National Programme in Indonesia
- **Dr. Maria Brokhaus**, Scientist, Forests and Governance Programme, Center for International Forestry Research, Bogor
- **Pak Tachrir Fathoni**, Director General, Forestry Research and Development Agency, Bogor
- **Pak Dharsono Hartono,** President Director, PT Rimba Makmur Utama
- **Pak Yuyun Indradi,** Political Forest Campaigner, Greenpeace, Jakarta
- **Pak Darmawan Liswanto**, Indonesia Programme Director, Flora and Fauna International
  Ibu Avi Mahaningtyas, Chief of Cluster, Environmental and Economic Governance, Kemitraan
- **Dr. Moira Moelyono**, Senior Associate, Forests and Governance Programme, Center for International Forestry Research, Bogor
- **Pak Abdon Nababan**, General Secretary, The Indigenous People Alliance of the Archipelago (AMAN)
- **Mr. Alfred Nakatsuma**, Regional Environmental Advisor, United States Agency for International Development, Jakarta
- **Pak Heru Prasetyo**, Unit President, Secretary of the Task Force of REDD+
- **Dr. Joar Strand**, Counsellor, Norwegian Embassy, Jakarta
- **Dr. Doddy Sukardi**, Secretary of Working Group on Land Use, National Climate Change Council
- **Ibu Rini Sulaiman**, Climate Change and Forestry Adviser, Norwegian Embassy, Jakarta
- **Pak Teguh Surya**, Head of the Department of International Relations and Climate Change, Indonesia Forum for the Environment
- **Ibu Mina Susana Setra**, Advocate of Foreign Affairs, The Indigenous People Alliance of the Archipelago

Satuan Tugas REDD+
National REDD+ Taskforce

Pak Mubarik Ahmad – Senior Consultant/Advisor on Climate Change Policy, World Bank
Pak Heru Prasetyo – Secretary of Working Group on Land Use



For our first meeting, we interviewed Pak Heru Prasetyo and Pak Mubarik Ahmad, two members appointed in 2011 by the President of Indonesia to the National Task Force on REDD+. In his presentation, Mr. Prasetyo talked about the diverse perspectives different stakeholders have of forests, land tenure, and indigenous people, and how these differences have triggered problems in implementing REDD+. He also explained the role of the National Task Force, national strategies for REDD+, and about Indonesian REDD+ readiness. Mr. Ahmad explained about the economic aspects of REDD+ for Indonesia. This meeting was valuable because it helped give us a formal introduction to REDD+ in Indonesia.

Aliansi Masyarakat Adat Nusantara
Aliance of Indigenous People of the Archipelago

Pak Abdon Nababan – General Secretary
Ibu Mina Setra – Advocacy of Foreign Affairs

Alliansi Masyarakat Adat Nusantara (Alliance of Indigenous Peoples in the Archipelago, AMAN) is an indigenous rights organization that represents hundreds of Indonesia's communities governed by customary law (*masyarakat adat*). Through a short video and a presentation, Ibu Susetra demonstrated the historical tribulations of the *masyarakat adat* and their skepticism of REDD+ schemes. Our questions for both Ibu Susetra and Pak Nababan emphasized the fact that the Indonesian government has room for improvement in its relations with *masyarakat adat*. Indeed, AMAN sees REDD+ as a political tool used, at best, to micromanage natural resource use by *masyarakat adat*, and at worst to marginalize indigenous rights. Their perspectives were helpful in illuminating the many challenges REDD+ faces in uniting diverse stakeholders.

Dewan Nasional Perubana Iklim
National Council on Climate Change

Dr. Doddy Sukardi – Chairperson of LULUCF

We started our second day of research with an interview with Dr. Doddy Sukardi at Dewan Nasional Perubahan Iklim (National Council on Climate Change, DNPI), one of the new agencies the Indonesian government has created to focus on climate change. Dr. Sukardi started the interview with a presentation on the role of the DNPI and their position on REDD+, of which they are supportive. A significant portion of the presentation discussed the plan for REDD+ implementation, the phases of implementation, and the role of donors and the international community. After the presentation we started an in depth discussion of some of REDD+'s challenges and critiques. One of the issues we discussed thoroughly was how the problem of land tenure can be addressed to satisfy all the stakeholders, as this is a key issue and became central to our report. The information from Dr. Sukardi and the DNPI and the issues we discussed during this interview proved to be a key resource for our report.

Royal Norwegian Embassy, Jakarta

Dr. Joar Strand – Counselor for Forest and Development
Ms. Rini Sulaiman – Climate Change and Forestry Adviser

From the Norwegian Embassy interview we learned that the funding mechanism for REDD+ works for Indonesia. It is not only important for Indonesia as recipient, but also for industrial countries responsibilities to take part in climate change mitigation efforts. Dr. Strand stressed Norway's commitment to REDD+ in Indonesia, and also acknowledged the many problems that it faces, such as corruption. According to Dr. Strand and Ms. Suleiman, Norway's perceives this project is an investment to maintain sustainable development. This visit provided us with a glimpse into the international politics surrounding REDD+ in Indonesia.

Royal Norwegian Embassy, Jakarta

Dr. Joar Strand – Counselor for Forest and Development
Ms. Rini Sulaiman – Climate Change and Forestry Adviser

Our interview with WALHI presented us with a critical view of REDD+ from a civil society organization. WALHI is an Indonesia NGO focused on environmental issues. We were given a presentation entitled "WALHI for Indonesia" by Pak Mohommad Teguh Surya, the Head of the Department of International Relations and Climate Change. In the presentation, we learned that WALHI does not support REDD+ because they believe that it provides a false solution to climate change. WALHI believes that REDD+ provides a way for industrialized countries to continue emitting greenhouse gasses. Instead, they propose that community management projects are the best way to preserve forests, and that the problem of deforestation does not require an international initiative. WALHI stressed the need for Indonesia independence and sovereignty. This interview was enlightening because it provided us with a dissenting opinion of REDD+. WALHI's criticisms helped us identify some of the most controversial aspects of REDD+ in Indonesia to incorporate into our report.

UN-REDD Programme Indonesia

Ibu Laksmi Banowati – National Project Manager

We began our third day of research by interviewing Dr. Machfud, Pak Ucok, and Ibu Laksmi of the UN-REDD office in Jakarta, Indonesia. The staff of UN-REDD opted not to give an opening presentation and so we began with questioning. The staff told us that their UN-REDD was primarily concerned with developing a funding mechanism for REDD+ in Indonesia rather than developing a carbon market mechanism. We also learned that thus far, bilateral agreements between countries have taken the place of large-scale multilateral treaties. We also got to see the carious publications the office had produced in order to disseminate information to local communities and *masyarakat adat*.

Flora and Fauna International

Pak Dharmawan Liswanto - Director

We had a chance to get a similar perspective of forest conservation during the interview with the director of Flora and Fauna International (FFI). From the FFI interview we learned that the organization has projects several areas of Indonesia, such as Kapuas Hulu and Katapang regions, focusing on addressing problems of greenhouse emissions, habitat loss, rapid forest loss and logging. While initiating the change, FFI focuses on carbon counting; protection of forests, such as patrolling and protecting from potential fires; prevention, by establishing community based protection units to monitor forests; resource and forest management, by providing field data and updates to the people. FFI's success in projects relates to partnerships that they develop with local communities and the sense of belonging that they establish in their project areas. Although, they are not involved in any REDD+ projects, FFI views it as a practical approach to fight deforestation and forest degradation.

PT Rimba Makmur Utama

Pak Darsono Hartono

To understand the perspective of private companies in REDD+, we met with Mr. Dharsono Hartono, a businessman who has devoted his energy to private forest conservation with the intent of selling carbon credits. PT RMU is a private sector organization that is working to conserve around 220 thousand hectares of peat forest in Central Kalimantan. Mr. Dharsono Hartono, the company's chairperson, explained his conservation project and his goals for eventually using his land concession to enter a carbon market trading system. His project is unique and groundbreaking as he is following all "best business" practices and is taking in local community participation in his conservation project. He believes that his company will serve as a model for others to do the same, and believes that there are many profitable opportunities presented by REDD+.

Rimbawan Muda Indonesia
Indonesia Institute for Forest and Environment

Pak Indra N. Hatasura, Ibu Nani Saptariani, Pak Eman Sulaeman, Pak Asep Suryana

On January 6 2012, we planned to visit Hamlet Nyungcung near Bogor. This village is connected with an NGO called the Indonesian Institute of Forest and Environment (RMI). Before visiting Hamlet Nyungcung, we visited RMI office in Bogor. We got a very warm welcome from RMI staffs including Ibu Nia Ramdhaniaty who gave us a brief description about RMI and Hamlet Nyungcung. She has the responsibility for running the organizational and advocacy program for people's rights and assurance of land and natural resources in Halimun ecosystem area. In her presentation, she explained how the local community manages the forest in the village within a National Park area owned by the government and how RMI supports them through an advocacy program and capacity building. It is very important for us to understand interaction between local, government, and NGO regarding forest management in Indonesia to give us a perspective on how REDD+ should be implemented.

Hamlet Nyungcung

Home-stay observation of local community livelihoods and conservation methods

Nyungcung village is located 60 miles southeast of Jakarta, in a rural upland area with substantial forest. While the Task Force was unable to visit an actual REDD+ pilot project, Nyungcung was an excellent stand-in. The village is site to both the RMI capacity-building project and a Ministry of Forestry model conservation project (MKK). Indonesia's historical battle between extractive industry and local communites was particularly salient here. A few years earlier, the people of Nyungcung successfully pushed out a mining operation that threatened their local watershed with erosion and toxic runoff. Currently, Nyungcung leaders are planning a strategy to reclaim nearby land under a soon-to-expire concession to a rubber plantation. Through group interviews and extensive hiking adventures, students witnessed both the beauty of the Indonesian rainforest and some of the methods at work to sustain or defend them. For the UW students, the homestay experience was a particularly fascinating window into Indonesian culture. The friendship and food enjoyed during the weekend stay in Nyungcung will not be soon forgotten.

United States Agency for International Development Indonesia

Mr. Alfred Nakatsuma – Director of the Office of the Environment

USAID
INDONESIA

We went through very rigid security examination before we went inside the USAID office, and met Mr. Alfred Nakatsuma. Mr Nakatsuma presented the USAID environmental programs in Papua and Sumatera, and USAID's efforts to amalgamate REDD+ and DRR in Indonesia. He clearly emphasized the development of equal partnership with the government of Indonesia, realizing the importance of Indonesian political, economic, and environmental positions in the international arena. USAID is attempting to remain neutral on local Indonesian issues and work behind the scenes for the overall goals of the Indonesian people and government.

Epistema Institute

Pak Mumu Muhajir – Manager of Environmental Law and Justice Program
Ibu Myrna A. Safitri – Executive Director

EPISTEMA is an NGO focused on soft advocacy and legal research which will support the arguments of fellow NGOs working more progressively. Myrna Safitri, the executive director of Epistema, highlighted the unpreparedness of Government of Indonesia as the biggest challenge for REDD+. Different interests between government agencies in the same level as well as between national and subnational had led to the inexistence of vertical and horizontal integration. Furthermore, corruption, overlapping regulation, weak law enforcement, and marginalized voice demand for rights acknowledgement, are queuing in the long list of problems urgently be addressed by the government. Mumu Muhajir spoke from his research experience and worried that the government might consider REDD+ as a short project, and thus not make the best effort towards the sustainability of the program.

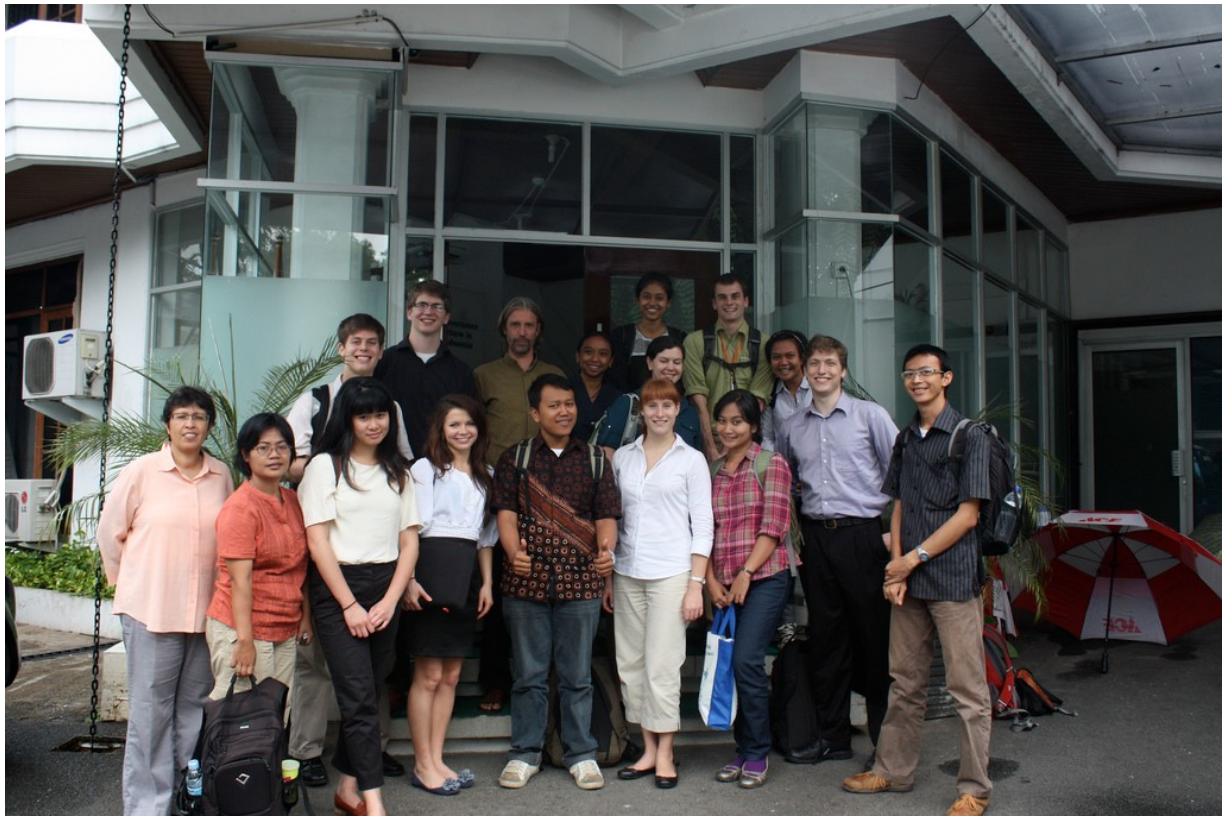
Samdhana Institute

Mr. Patrick Anderson - Fellow

On this day, we talked to Patrick Anderson from the Samdhana Institute. At the Samdhana Institute, we came to understand that there are many issues that make it difficult for the REDD+ program to be successfully applied in Indonesia. Patrick Anderson gave us an explanation about free, prior and informed consent (FPIC) that encourages efficient and equitable climate change mitigation in the REDD+ program. Since we interviewed many institutions that are stakeholders in the REDD+ program, it seems like there are many people who are pessimistic about REDD+'s ability to successfully facilitate and define indigenous people's rights. From Patrick's explanation about FPIC, we were encouraged by the possibility of this process to promote actualized indigenous rights.

Kemitraan

Ibu Avi Mahaningtyas – Chief of Cluster, Environmental and Economic Governance



Kemitraan is a national NGO initiated by the government that takes international funding and allocates it to other NGOs in the implementation of local REDD+ projects as well as ensure that REDD+ will be effective, equitable, and efficient at the community level. Indirectly, they also improve public policies, which will potentially reduce impediments to REDD+ stemming from government ineffectiveness and corruption. From the interview we learned about the importance role of Kemitraan is gaining trust from international level, national level, and also local community level in order to achieve good governance at REDD+ project.

Kemitraan

Ibu Avi Mahaningtyas – Chief of Cluster, Environmental and Economic Governance

Greenpeace is one of the big international NGOs (also known as BINGOs) working on REDD+ in Indonesia. They have 30,000 active supporters in Indonesia. They operate publicity campaigns to raise awareness and influence the population's sentiment on environmental issues. Our two interviewees, Pak Yuyun Indradi and Pak Joko, expressed to us that they considered their campaigns on forest conservation in Indonesia to be among the most successful campaigns of Greenpeace because the general population in Indonesia is now in favor of the government advancing forest conservation policies. Through our discussion with Pak Yuyun and Pak Joko at Greenpeace we learned about the role of civil society in influencing national policy. Through its campaigns, Greenpeace hopes to make policy makers push for further anti-deforestation policies, eventually achieving zero deforestation. In our discussion we also learned how Greenpeace is attempting to close the knowledge gap on climate change issues. Our interviewees pointed out that while everyone is generally on the same page on deforestation, there exists a large knowledge gap between people living in local forest communities and policy makers in Jakarta. This knowledge gap can go both ways on issues like community forest management and the forestland concession process.

Kemitraan

Ibu Avi Mahaningtyas – Chief of Cluster, Environmental and Economic Governance

The Center for International Forestry Research (CIFOR) is a global nonprofit organization based in Bogor Indonesia that focuses on environmental conservation and human wellbeing. This meeting, one of our last, began with a presentation by Dr. Maria Brokhaus, a scientist in the Forests and Governance Programme, briefly describing the international research that CIFOR has conducted on REDD+. The task force members were then able to present our basic understanding of REDD+ to a group of experts in the organizations. In groups of three, we took our research from the past two weeks and outlined what we perceived as the most important issues in REDD+. The experts from CIFOR then responded to our presentations and provided constructive criticism. Their feedback encouraged us to focus on the complexities of REDD+ and how it has interacted with a variety of stakeholders. CIFOR's excellent suggestions were incredibly useful as they helped us refine the way in which we approached REDD+ in our policy recommendation.

Forestry Research and Development Agency

Pak Techrir Fathoni – Director General
Pak Ari Wibowo

During our visit to FORDA, Pak Salisto Saran, Pak Ari Wibow and other FORDA staff graciously hosted us. The presentations from the FORDA representatives were very informative. In particular, we learned about how FORDA conducts research to report back to the Ministry of Forestry. Thus, FORDA has an important role in influencing the Ministry of Forestry's decision-making in regards to REDD+ design and implementation. The presentations highlighted the use of Demonstration Activities to evaluate how forest communities can cooperate with the Ministry of Forestry and national parks.

Task Force Instructors

Suraya Afiff- Universitas Indonesia

She is a lecturer at the Anthropology Graduate Program, University of Indonesia. She serves as the Head of Center for Anthropological Studies. Her research focuses on the political ecology of environmental changes in Indonesia, climate change, biofuel, forest and land tenure and conflicts.

Celia Lowe- University of Washington

Celia Lowe is Associate Professor of Anthropology and International Studies. She has worked in Indonesia since 1993 and taught there as a Fulbright Scholar from 2008-2010. Her research concerns the cultural study of science and technology. Her book, Wild Profusion: Biodiversity in an Indonesian Archipelago, was published in 2006, and she is now writing a book on the Indonesian experience with avian influenza.

Task Force Expert Evaluators

Todd Larson

Todd Larson served around the world and throughout the United Nations system for two decades, he retired as Senior Counselor to the UN, one of the highest, non-diplomatic positions in the UN. His work with the UN included advising the World Intellectual Property Organization, the UN High Commissioner for Refugees (UNHCR) and the UN Department of Peacekeeping Operations. He is co-Chair of the International Gay and Lesbian Human Rights Commission. He served as Peace Corps Volunteer in Togo from 1983-1985, following which he received his Master's Degree (International Studies, Jackson School) and Juris Doctor from the University of Washington, Seattle.

Muhammad Farid

Pak Muhammad Farid has served as the Secretary of Land Use, Land-Use Change and Forestry (LULUCF) for Dewan Nasional Perubahan lklim (National Council on Climate Change, DNPI) since July 2010. His main task is to assist the head of taskforce in convening relevant stakeholders and gathering their opinions, suggestions and recommendations about Indonesia's position on LULUCF and REDO+ issues. In addition, Pak Muhammad Farid serves as the Secretary of the Post Kyoto 2012 Working Group for DNPI. Through this role, he is able to prepare Indonesian contributions to UNFCCC negotiations.

Teaching Assistant

Mia Siscawati – University of Washington

She is a PhD Candidate in Sociocultural Anthropology at the University of Washington. Her dissertation examines the complex interactions between cultures, power, gender and material realities within collaborations between academic scholars and members of social movements in the community forestry movement in Indonesia. She further explores how these interactions transform forestry science and shape social movements in Indonesia. She has been involved in social movements in Indonesia since the late 1980s. She participated in a series of forest policy advocacies at the international level, including the UN Forum on Forests during the late 1990s. In 2009, she received the Kartini Award as one of the most inspiring women in the field of environment in Indonesia.

Program Assistant

Amira Waworuntu – Universitas Indonesia

Recently graduated from Social Anthropology with a thesis on semiotics and music. She joined this Task Force as a Program Assistant, guiding the activities and coordinating the needs of the participants, including the teleconferencing up until the last minute. Although having no background whatsoever in environmental studies, she has grown fond of the issues brought up while working with the Task Force.

Task Force Members

Nathan Anderson (Copy Editor)- University of Washington

As an undergraduate majoring in International Studies with a focus in Environmental Studies, Nathan's research has focused around the environment in a global context. Particularly, he is interested in examining the ways in which global economic, political, and social processes both contribute to and attempt to mitigate climate change. In this report, Nathan focused on issues of Indonesian land tenure and how it interacts with the effectiveness, efficiency, and equity of REDO+.

Henry Apfel (Coordinator)- University of Washington

As an International Studies and economics major, Henry was interested in understanding the problems of demand and valuation that have contributed to deforestation in Indonesia.

Sarah Boone (Editor)- University of Washington

As editor of this report, Sarah worked to help coordinate chapters from the very beginning of the writing process, editing drafts for both clarity and content. She focused especially on maintaining the tone and style of policy writing and supported all topical research groups in their work and in constructing policy recommendations. Her broad research on REDO+ led her to consider the ways that this policy is not only an environmentalist project, but also presents great opportunities for general social and political reform in Indonesia.

Sandi Halimuddin - University of Washington

Her research emphasizes the dynamics the of global participation in REDO+ in Indonesia. To do so, she explored the ways in which international participants can share the responsibility of climate change mitigation. She was particularly interested in the idea of how international alignment of interests and strategies to those of the Indonesian government can be instrumental in protecting Indonesia's sovereignty.

Emir Hartato - Universitas Indonesia

As an undergraduate geography student, Emir has focused his interest on land tenure issue in Indonesia. Throughout his research, he has studied the history of forest management in Indonesia and how conflicting spatial data could result in tenurial issues. He has also studied how participatory mapping process can help solve the problem.

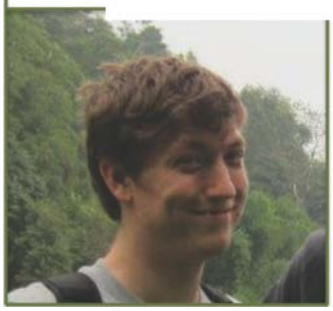
Yeni Kristanti - Universitas Sanata Dharma, Yogyakarta

Yeni focused on knowledge dissemination and community participation in Indonesia's REDO+ implementation. She aimed to locate the knowledge gaps among different stakeholders in two different subjects, namely knowledge dissemination and community participation. She was also responsible to analyze the language barrier in the knowledge dissemination process, one of crucial problems in REDO+ implementation.

Ayu Nova Lissandhi – Lembaga Ilmu Pengetahuan Indonesia

Ayu is a junior researcher from Lembaga Ilmu Pengetahuan Indonesia (Indonesian Institute of Sciences). She focused her interest on the knowledge of REDO+ stakeholders in Indonesia. Throughout her research, she wanted to analyze the role of each stakeholder in order to enhance their knowledge about REDO+ which will be affected by their institutional background.

Jared Moore- University of Washington



Past experience in International Studies with an Environmental Studies focus prompted Jared to investigate the impacts of international demand for tropical commodities such as palm oil on Indonesia's forests. Jared also researched holistic incentive systems for REDO+, and sincerely hopes that such compensation schemes prove fruitful and proactively engage a wide variety of stakeholders.

Nataliya Piskorskaya- University of Washington

Studying immigration and human rights globally inspired her to focus her research on education system in Indonesia and the influence it may have while informing Indonesians about REDO+. More specifically, she examined how information is transferred to various communities in Indonesia and the ways to facilitate participation of marginalized groups.

Sari Damar Ratri– Universitas Indonesia

As a young anthropologist, Sari is interested on knowledge production and collective action issues. Her passion of these topics drive her to write about knowledge dissemination in REDO+ from a multilevel aspect. Through her works, she wants to explain that every actor involved in the REDO+ program has a different perspective, role and interest, and that various kinds of knowledge are reproduced differently depending on the context and situation.

Nety Riani Dari- Universitas Indonesia

Being a human, Nety is fond of nature and loves to be involved in any preservation program. Being an Indonesian, she is consistently critical of the Government of Indonesia. Her fascination with REDO + is deeply rooted in issues examining how good financial governance as well as international involvement could result in sustainable development in Indonesia.

Rahardhika Arista Utama- Universitas Indonesia

Being an undergraduate sociology student focusing on social development, Rahardhika has a passion to study the relationships between society and other stakeholders in development programs. Through his works, he aimed to analyze land tenure conflicts which involve local communities and indigenous people as well as community participation in REDO+.

Lucas Simons – University of Washington

Though he didn't have much knowledge about climate change politics going into the task force, Lucas was interested in learning about how the state handles such a globally important issue in its dealings with the private sector, civil society and the international community. In writing the report he focused on where funding comes from for such a program and what sort of funding mechanisms are necessary to establish a foundation for REDO+ to make sure it is successful and sustainable.

Kristi Young- University of Washington

In addition to coordinating the chapter on good governance Kristi wrote on the legal problems surrounding land tenure and the role of the international community in supporting the production of sustainable palm oil. Throughout her research she wanted to study the role of both international and Indonesian laws in helping combat climate change and supporting environmental justice.

Reflections

“The collaborative process involved working really closely with the students form Indonesia and making sure we did not come from this from a purely American academic perspective. So every product that we came up with was the result of consultation and coordination with other students and not the solely the product of one mind.”

-Nathan Anderson

“The opportunity in this task force was to travel and be involved in hands-on, on the ground research. Undergraduate students usually do not have this option. We were able to collaborate with a team from another part of the world, which accurately represents the benefits and challenges of the real world.”

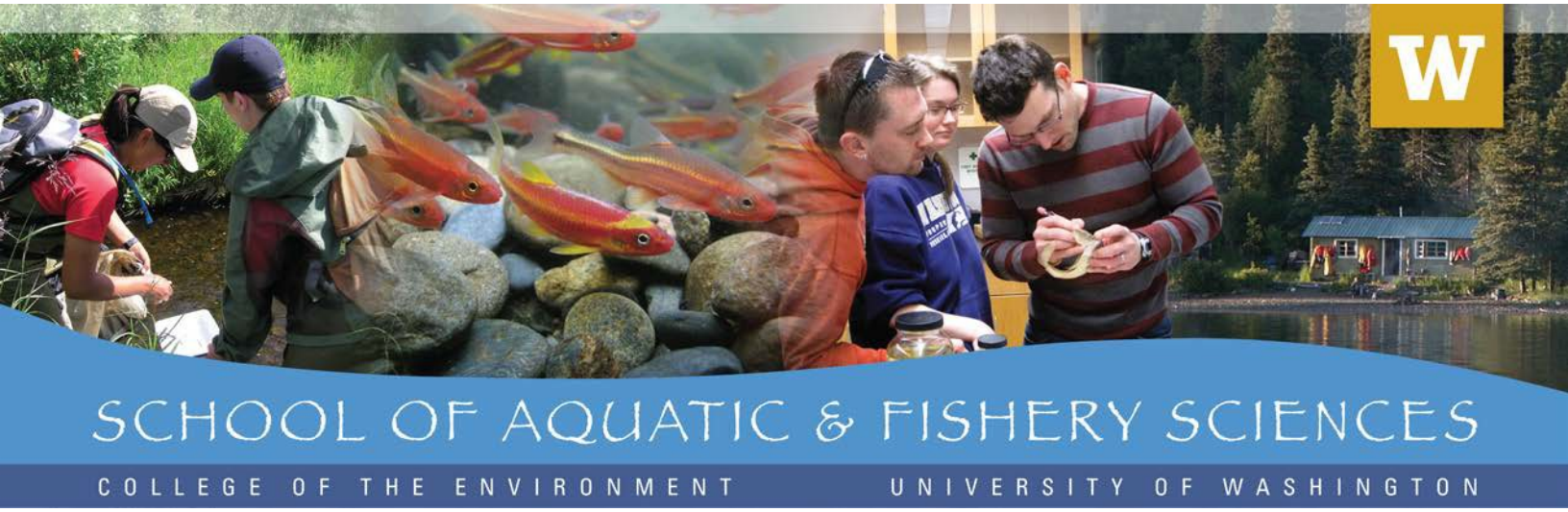
-Sarah Boone

“I'm really grateful that I'm part of this collaboration and I hope we can collaborate again next time, making other policy reports that could help solve today's problem and save the world!"

-Emir Hartato

“I envisioned a transformation in international studies education that was no longer about the America and the powerful nations imposing ideas on other places. It was to be a process of rewriting script and how rich and developing countries can engage together in an environmentally transformative experience. “

-Professor Celia Lowe



Senior "Capstone" Research Experience

Introduction

The School of Aquatic and Fisheries Science (SAFS) requires all undergraduate majors complete an independent research project in their senior year. Our intent is to provide an experiential and supportive environment for students, where they can implement their degree learning in novel ways and contribute to science early in their careers. The research experience considerably strengthens student curriculum vitae, is valued by employers, and is often cited as the most important and enjoyable component of the undergraduate experience. The capstone has also provided a key tool for the assessment of our degree.

Alignment of the capstone with SAFS undergraduate learning goals

The School's undergraduate learning goals fall into four categories:

- Acquisition and synthesis of knowledge (includes acquiring core and supporting subject matter, interpreting and applying knowledge to new situations)
- Communication skills (includes writing and verbal communication, particularly in the sciences)
- Research skills (includes hypothesis development, data collection and interpretation, synthesis and reporting)
- Critical thinking, problem solving and attitude (includes differentiating fact and opinion, understanding limits to science, inferential skills, ethics, social settings).

The capstone integrates the learning goals at the culmination of the degree. Specifically, students are required to apply their knowledge to new situations, implement their research skills using ethical practice, communicate their findings through writing and oral presentations, and place their findings within scientific and social contexts.

Capstone Models

There are a number of ways that students identify and develop their research directions:

- Faculty provide research questions, often as a component of their programs
- Students identify their project independently and seek a faculty mentor
- Group research projects are developed, often originating in a senior level class
- Internships in a faculty or collaborating Agency lab are expanded
- Specific internship programs funded with collaborating government Agencies (e.g. NOAA Alaska Fisheries Science Center – SAFS summer internships) provide research directions

Our field site programs (e.g. Alaska Field Camp, Friday Harbor Laboratories) play an important role in this process, because they offer unique research opportunities.

Description of process

Capstone students are guided throughout the process by a dedicated capstone advisor, a faculty mentor, and often, a work site mentor such as a graduate student or collaborating scientist in a government Agency. Research is conducted over a minimum of three quarters. There are three components to the project

1. *Capstone preparation*, guided by the capstone advisor. During this quarter, students prepare by identifying the research topic, meeting the faculty advisor, completing background reading, acquiring permits and writing their proposal. The latter has a clear outline and follows typical scientific format.
2. *Data collection,* guided by the faculty mentor, involves field sampling and experimentation, laboratory experiments or database exploration (or a mixture of these activities).
3. *Data presentation,* guided by the faculty mentor. Results are analyzed and written as papers in the style of a peer-reviewed scientific journal with appropriate graphs and tables. Students also present their research formally in a scientific setting, such as the Mary Gates Undergraduate symposium, the SAFS undergraduate symposium, Agency seminars and professional scientific meetings.

Lessons learned about the degree

The capstone process has provided a key framework for assessing student learning. Our experience of capstone performance has largely motivated the following recent changes to the degree:

1. A reconfiguration of our degree requirements at the 300- and 400- level to ensure that students gain the necessary skills, breadth and depth to support independent enquiry
2. Expansion of our SAFS honors degree capstone to enhance research skills
3. Development of a 200-level writing class to meet the clear need in improving undergraduate writing early in their education

More recently (Fall 2012), the capstone was used to assess our learning goals. In a discussion facilitated by the Office of Educational Assessment (OEA) we learned:

1. The goals of the capstone experience are consistent between students and track the learning goals of the degree
2. Students, regardless of background motivation, are excited by independent research, *advance their skill in scientific inquiry… and demonstrate that they have met the learning goals* (OEA text in italics).
3. There were three areas that can be enhanced further in our degree: early student motivation, improvement of writing skills, and development of student awareness of the "bigger picture" in their research. These areas are being, or will be, addressed in the upcoming year.
4. The capstone provides us with a framework for tracking the outcomes of recent changes in our curriculum, since we can compare performance before and after the changes.

Additional files

Many of our capstones projects lead to publications in peer-reviewed scientific journals, with faculty mentors. Three publications with the capstone student as first author are appended.

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Open Access

Research Article

Multi-scale habitat occupancy of invasive lionfish (*Pterois volitans*) in coral reef environments of Roatan, Honduras

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Abstract

The Indo-Pacific lionfish species [*Pterois volitans* (Linnaeus, 1758) and *P. miles* (Bennett, 1828): Family Scorpaenidae] are the first non-native marine fishes to establish in the Western North Atlantic and Caribbean Sea. Despite the continued documentation of its range expansion and highly publicized invasion (including public-driven removal efforts) there remains a paucity of basic information on lionfish ecology. This knowledge gap limits effective long-term management. In this study we conducted a multi-scale investigation of habitat occupancy of a newly established population of lionfish in Roatan, Honduras. Based on field surveys and citizen sightings in Roatan Marine Park we found that lionfish occurred more frequently on aggregate coral reef habitats (54% of sightings) compared to patch reef habitats (30%) and sea grass lagoons (16%). In general, these aggregate and patch reef habitats contained adults (mean total length =118.9 mm and 114.7mm, respectively) whereas sea grass habitats contained juveniles (mean total length=89.5 mm). At the micro-habitat scale lionfish occupied areas dominated by hard coral and overhanging structure; the same microhabitats containing native fishes of concern – grouper (Nassau grouper, *Epinephelus striatus*; yellow fin grouper, *Mycteroperca venenosa*) and snapper (dog snapper, *Lutjanus jocu*; mutton snapper, *Lutjanus analis*). Results from this study contribute information on basic habitat requirements of lionfish and inform current management removal efforts focused on containing spread and mitigating their impacts on native species.

Key words: lionfish, habitat occupancy, microhabitat

Introduction

Invasive species are recognized as a leading threat to marine biodiversity (Carlton and Geller 1993; Ruiz et al. 1997; Grosholz 2002; Kappel 2005). In a recent synthesis of non-native species in marine environments, Molnar et al. (2008) lamented the numerous, and often, large knowledge gaps in our current understanding of the basic ecology for many species. This is particularly the case for coral reefs, which have been identified as a neglected research area in invasion biology (Coles and Eldridge 2002). Fundamental ecological data that is lacking for many introduced marine species include habitat occupancy; a strong indicator of potential spread and impact (Grosholz and Ruiz 1996), including coral reef fishes (Kane et al. 2009).

The lionfish [*Pterois volitans* (Linnaeus, 1758) and *P. miles* (Bennett, 1828): Family Scorpaenidae] are the first non-native marine fish species to establish in the Western North Atlantic and Caribbean Sea (Whitfield et al. 2002; Schofield 2009, 2010). Native to the Indo-Pacific, there have been both confirmed and unconfirmed records of lionfish off the coast of Florida (USA) since 1980s; a likely result of intentional aquarium releases (Padilla and Williams 2004; Morris and Whitfield 2009). Since their initial introduction, lionfish have spread rapidly. Populations have been documented from North Carolina (USA) to Jamaica, with individual sightings as far north as New York (USA) and as far south as Venezuela (USGS 2011). It appears that the northern range may be limited by cold winter water temperature (Kimball et al. 2004), but the southernmost established populations are spreading and currently found between Honduras and Venezuela (Schofield 2009, 2010; Aquilar-Perera and Tuz-Sulub 2010). Despite growing literature documenting range expansion there is little information on its basic habitat requirements.

The rapid establishment and spread of lionfish is the result of multiple factors, only some of

which have been thoroughly investigated. There are few known predators of this species both in their native and introduced ranges (Malijković et al. 2008; Morris and Whitfield 2009), especially for adult lionfish, likely because their venomous spines (Morris 2009). The potential ecological impacts of lionfish are still unknown, although preliminary reports suggest that the invasions could have devastating effects on coral reef fish communities (Meister et al. 2005). In the Bahamas, lionfish are widespread (Smith and Sealy 2007; Green and Côté 2009) and were found to reduce recruitment of reef fish by up to 80% (Albins and Hixon 2008). Lionfish have been found in a variety of habitats ranging from wrecks and solid substrate in proximity to coral reefs (Fishelson 1997) to mangroves (Barbour et al. 2010), and our research aims to quantify their occurrence in these different habitats. Such information is paramount for guiding management actions that focus on the containment of spread and mitigation of ecological impacts via government and citizen-based removal efforts.

We combined data collected by citizen scientists with our own field surveys to provide an examination of habitat occupancy by a newly established population of lionfish in Roatan, Honduras. First, we quantified occupancy among major macro-habitat types of aggregate reef, patch reef and lagoon/sea grass. Second, we evaluated micro-habitat use of lionfish within macro-habitat types, focusing specifically on substrate composition and the availability of overhanging structure. Patterns of lionfish abundance were compared to two native taxa species of concern – grouper [Nassau grouper, *Epinephelus striatus* (Bloch, 1792); yellow fin grouper, *Mycteroperca venenosa* (Linnaeus, 1758)] and snapper [dog snapper, *Lutjanus jocu* (Bloch and Schneider, 1801); mutton snapper, *Lutjanus analis* (Cuvier in Cuvier and Valenciennes, 1828)].

Methods

Study region

Roatan is the largest and most populated of the Bay Islands, located on the north coast of Honduras in the western Caribbean Sea. It is 200 km^2 (50 km long and 2–4 km wide) in area and is primarily surrounded by fringing and barrier reefs, with extensive mangrove wetlands on the east end. The fringing reef provides a wide spectrum of habitats including lagoons containing turtle grass (*Thalassia testudinum*), patch reef (an isolated, comparatively small reef outcrop surrounded by sand or sea grass) and aggregate sloping reef (a grouping of 3–10 patch reefs of various sizes that share a common area of surrounding sand or sea grass). The study region consists of approximately 12 km along the northwest coast, including 8 km in Roatan Marine Park. The marine park has strict regulations against fishing or harvesting animals (with the exception of removing lionfish) and regulates boat use and recreational diving.

Field surveys

We conducted twenty-one visual surveys partitioned equally between three macro-habitat types – aggregate reef (n=7), patch reef (n=7) and lagoon/sea grass (n=7) – over a two-week period from January 23 to February 5, 2010 during daylight hours of 09:00–15:00. We surveyed aggregate and patch reefs by SCUBA diving and sea grass sites by snorkeling. Each survey consisted of a single 50-m transect positioned parallel to the shoreline and included 5 equally spaced quadrats where habitat was categorized in a 2 m^2 area according to the percentage cover of hard coral, soft coral, sponge, sand, sea grass, rock, algae and overhead environment. The transect length was measured with the use of a reel with markings every 10 meters or with fin cycles (4 cycles/10 meters) when the use of a reel was not possible. A second diver conducted surveys at the same site for 30 minutes using the roving diver technique (RDT) (see Schmitt and Sullivan 1996) to locate lionfish, grouper (collectively *Epinephelus striatus* and *Mycteroperca venenosa*) and snapper (collectively *Lutjanus jocu* and *Lutjanus analis*) by freely roving in a given area and recording fish. For each fish sighting we recorded percent cover in a 2 m^2 area.

Marine Park data

We collated data on the presence and estimated total body length of lionfish within Roatan Marine Park for a 9-month period (May 22, 2009 to March 12, 2010) from sightings reported by recreational divers at locations throughout the marine park (geo-referenced to the dive site: http://www.roatanmarinepark.com/lionfish/). Because macro-habitats do not change greatly over time, the 21 survey sites were classified as

aggregate reef, patch reef and lagoon/sea grass using Google Earth. Field-based macro-habitat assignments of the 21 sites conducted during the field surveys were compared to macro-habitat classifications according to this method. We found 100% correspondence between the two classification methods. Total available macro-habitat in the marine park was estimated by calculating the area (length × width) for each habitat using the distances provided by Google Earth. To account for the additional area along the wall of aggregate reefs, a secondary calculation (depth × length) was added to the total area for aggregate habitat. Patch reef (39%) and sea grass habitats (37%) were the dominant macro habitats, aggregate reef was third most abundant (24%) and wrecks composed less than 1% of available habitat and thus are not considered further. We recognize two limitations of using this data source. First, recreational diver effort may not be randomly distributed across major macro-habitat types. Divers may have a greater tendency to visit reef habitats due to elevated marine biodiversity, although the proximity (and hence, ease of access) of lagoon/sea grass dive sites also attracts dive activity. Second, we acknowledge a number of methodological errors and biases associated with visual census techniques, including that estimates of total body length represent an approximation because they relied on untrained recreational divers without the use of a measuring device (Bell et al. 1985). Objects appear larger in water and this can lead to over-estimation of size without proper training and experience. However, all sight occurrences are checked for accuracy by Roatan Marine Park (as well as prior to our analysis); therefore clearly erroneous data was omitted.

Statistical analysis

Macro-habitat occupancy by lionfish in Roatan Marine Park was examined using an adaptation of Manly's selectivity index (Manly et al. 2002). This index was chosen because it does not fluctuate with inclusion or exclusion of seldom-used habitats (Manly et al. 2002) and is considered more versatile than other selection preferences indexes (Garshelis 2000). The equation for selectivity is:

$$w_i = u_i/(h_i \times u_{it})$$

where u_i= the count of type *i* habitat used by all lionfish, h_i= the proportion of available habitat *i*, and u_{it}= the total count of all lionfish for all habitats. The values were normalized using the equation $S_{norm} = w_i/\sum w_i$, where w_i is the selectivity value which varies from 0 to 1 for any macro-habitat type, and takes on the value of 0.33 if habitat selection is random in the case of our study. A log-likelihood chi-squared analysis (recommended by Manly et al. 2002) was conducted to determine if the observed distribution between macro habitats was different from the total available habitat. A student's t–test was used to compare micro-habitat characteristics between sites with and without lionfish, groupers and snappers, as well as to test for differences in lionfish size distributions between macro-habitats.

Results

A total number of 531 sightings of lionfish were reported by recreational divers in Roatan Marine Park during the 9-month period. Lionfish occupied aggregate reefs in over half the sightings (54%), followed by patch (30%) and sea grass habitats (16%). According to Manly's index of selectivity there was a non-random pattern of macro-habitat occupancy (log-likelihood χ^2 =21.4, df = 2, P≤ 0.001). Aggregate reefs were more likely to be occupied by lionfish (P=0.006), occurrences in patch reefs did not differ from random (P=0.108) and sea grass habitats contained lower numbers of lionfish than expected based on its availability in the park (P≤0.001) (Figure 1). These results may be influenced by non-random patterns of diving activities in the park; however, occupancy percentages correspond to those based on our field survey (see below).

Body length distribution of 511 lionfish (out of 531 sightings) observed by recreational divers in Roatan Marine Park varied between macro-habitat types, ranging between 25 mm and 381 mm (mean=113.1 mm, SD=51.5 mm). Average body length was significantly smaller in sea grass habitats (mean=89.5 mm, SD=39.5 mm, n=86) compared to both aggregate reefs (mean=118.9 mm, SD=54.3 mm, n=255) (t=5.40, df= 201, P≤ 0.001) and patch reefs (mean=114.7 mm, SD=48.5 mm, n=138) (t=4.24, df= 207, P≤ 0.001).

Lionfish were found in 7 out of the 21 survey localities (29% frequency of occurrence), which included 4 aggregate reef sites (57% of occupied sites), 1 patch reef site (14%) and 2 sea grass sites (29%). Across these macro-habitat types,

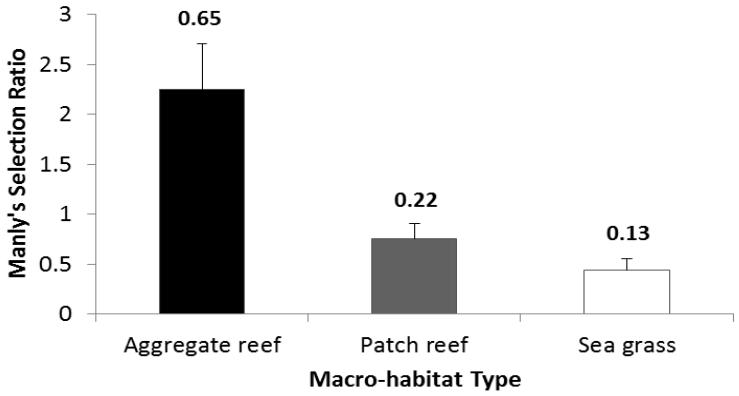

Figure 1. Manly's selection ratio for lionfish macro-habitat occupancy in Roatan Marine Park. Bars represent 1 standard error, and values represent standardized selection ratios.

lionfish (9 total individuals) inhabited particular micro-habitat substrate types (Figure 2A). We found that areas occupied by lionfish had a significantly higher percentage of hard coral ($t=2.09$, $df=112$, $P=0.038$) and overhanging structure ($t=3.56$, $df=112$, $P<0.001$), and a lower percentage of algae ($t=-2.02$, $df=112$, $P=0.045$) when compared to unoccupied areas. Groupers (29 total individuals) and snappers (49 total individuals) exhibited similar patterns of micro-habitat occupancy compared to lionfish, where individuals were more likely (but not significantly) to be sighted on hard coral and associated with overhanging structure (Figure 2B,C). For all species our limited sample size precluded an examination of micro-habitat occupancy for each macro-habitat type.

Discussion

Occupancy of lionfish along the northwest shoreline of Roatan, Honduras, was greatest in aggregate reef habitats compared to patch reefs and sea grass/lagoon habitats, and within these habitats lionfish tended to occur in areas of hard coral containing substantial amounts of overhanging structure. Hard coral may be providing opportunities for enhanced camouflage and protection compared to other substrates due to greater topography complexity (Fishelson 1997). Overhanging structure is favorable for ambush predation strategies by lionfish, which feed primarily in the morning hours 07:00 – 11:00 (Morris and Akins 2009). However, there is little information on behavior and substrate association during nocturnal periods. Preference and ability to select certain corals or areas of coral reefs based on microhabitat characteristics has been reported in other reef fish (Sale et al. 1984), and our findings can help guide future investigations and management strategies aimed at removal activities that target lionfish during daylight hours.

Given the large popularity of lionfish in the aquarium trade and its widely publicized invasion of marine ecosystems (Padilla and Williams 2004) it is surprising that limited research exists on its basic ecology. In their introduced range it has been suggested that lionfish are capable of reproducing year round with an annual fecundity of 2 million eggs (Morris et al. 2008). Our results showed that smaller individuals tended to occupy sea grass habitats compared to reef habitats; a finding also supported by Barbour et al. (2010). Lagoons composed of sea grass have long been classified as nursery grounds for many juvenile fish (Parrish 1989; Nagelkerken et al. 2002), and this may also be the case for lionfish. There is little documentation of size at time of settlement, but the smallest (and most recently settled) lionfish observed in this study was 25 mm. To obtain this size in a ~26 day larval stage (Ahrenholz and Morris 2010) would require a rate of growth of 1 mm/day from hatching at 1.5 mm (Morris et al. 2008). This would suggest that there is a relatively fast growing period to reach size at maturation from the observed size at settlement.

Morris and Whitfield (2009) found that lionfish reach sexual maturity within one year at a size of 100 mm and 180 mm for males and females, respectively. The average size of 89 mm

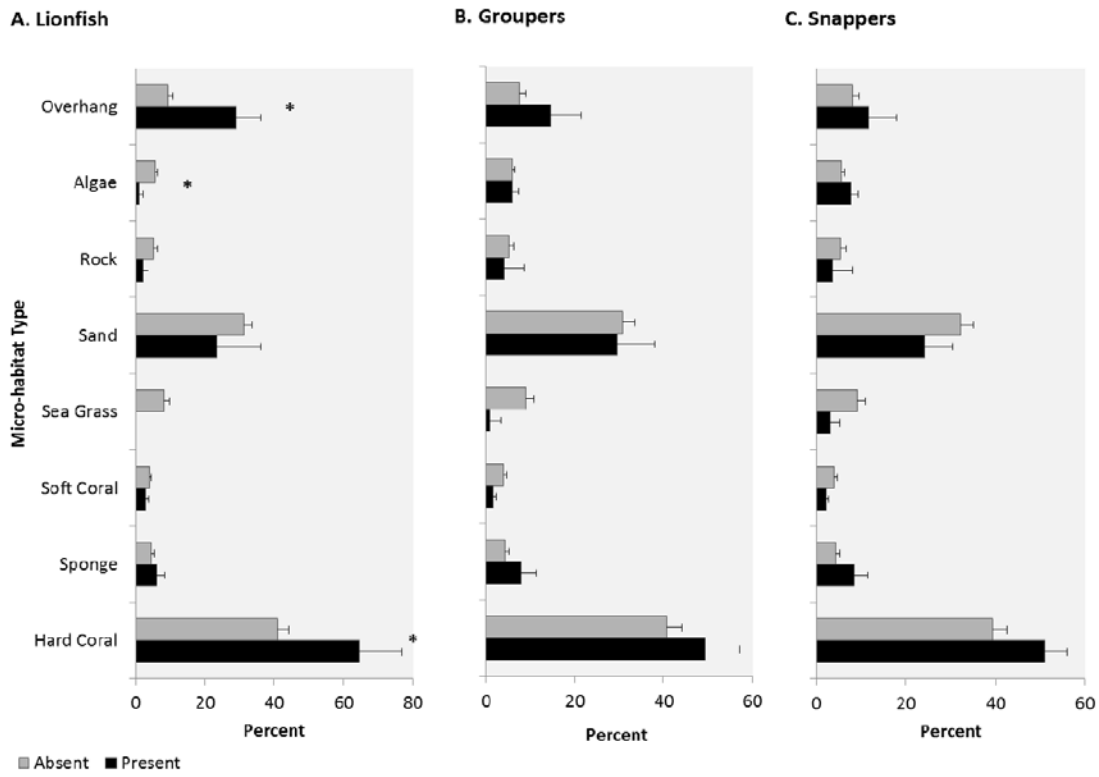

Figure 2. Micro-habitat substrate composition of presences versus absences for (A) lionfish, (B) groupers and (C) snappers. Bars represent 1 standard error. Statistically significant differences are indicated by * ($P<0.05$).

for lionfish in sea grass habitats indicates that fewer individuals are sexually mature in these areas compared to aggregate and patch reefs. These findings have direct relevance to current management strategies that are actively controlling lionfish throughout their introduced range. For example, in the Bahamas, current efforts focusing on the removal of lionfish include spearfishing and live capture by recreational divers, biologists and anglers on reef habitats and by island residents in shallow sea grasses. Targeting removal efforts in sea grass habitats containing juvenile lionfish may be beneficial for the long-term control of populations because these individuals are unlikely to have reached maturity and therefore have not contributed to the effective population. In support of this, recent population modeling results emphasized the importance of targeting juveniles as well as adults in removal efforts (Morris et al. 2010).

Lionfish have been shown to significantly affect the recruitment of juvenile reef fish (Albins and Hixon 2008), and previous studies between Florida and North Carolina have also found them to be equally abundant as grouper and snapper (Whitfield et al. 2007). Our survey found that two species of grouper (mean of 1.4 fish per transect) and two species of snapper (2.3) out-numbered lionfish (0.4), however longer term data suggests that grouper/snapper in Roatan are being depleted (Gobert et al. 2005). Nassau Grouper occupy similar settlement sites as lionfish, specifically around coral heads in lagoon areas (Eggleston 1995). This would put them in direct competition for food and other

resources during the juvenile life stage. As adults, lionfish and grouper have many of the same habitat preferences, including overhang areas or crevices which provide protection or cover (this study, Sadovy and Eklund 1999); therefore, we expect that predatory effects of lionfish on sensitive grouper species may also be prevalent.

The introduction and spread of lionfish into coral reef systems provides an opportunity for more inclusive management strategies that involve the public. The incorporation of citizen science is especially attractive with regards to lionfish because coral reefs attract tourism and in many cases, the local economy relies on the preservation of the coral reef ecosystem. Citizen science has proven to be useful in monitoring both the distribution and range expansion of non-native species such as Asian shore crabs [*Hemigrapsus sanguineus* (De Haan, 1853)] (Delaney et al. 2007) and the overall biodiversity of aquatic environments (Goffredo et al. 2010). Removal efforts are generally lacking within these programs and there have been very few assessments as to the efficacy of non-native removal efforts by citizen scientists. Lionfish seem to be an exception where citizen-removal programs are becoming increasingly common, including in Roatan Marine Park (http://www.roatanmarinepark.com/news/lionfish-derby/). For example, the data being collected by the Roatan Marine Park on lionfish occurrence and size illustrate a powerful form of citizen science, yet it could be augmented by integrating a protocol with the goal of recording lionfish absences. Data on the absence of lionfish is crucial in determining broad-scale habitat relationships and it provides the greatest opportunity to develop powerful ecological niche models that predict the secondary spread of invasive species for management purposes (Vander Zanden and Olden 2008). The Reef Environmental Education Foundation (REEF) has set up a program to utilize recreational SCUBA divers in this way. They have developed a survey for divers to perform during their dives to record information on the presence of lionfish and other species as well as certain habitat characteristics. We urge REEF to also consider the inclusion of species absence in their surveys. This kind of program would be a powerful addition to current lionfish management strategies aimed at deploying early detection and rapid response.

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We would like to thank the Roatan Marine Park and Matt Nawrocki for the use of their data set, and Diane Faulkner, Ian Drysdale and Reef Gliders dive shop for their assistance in the field. This paper benefited greatly from the reviews of three anonymous referees. Helpful guidance throughout the project was provided by members of the Olden Lab.

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Genetic Techniques Provide Evidence of Chinook Salmon Feeding on Walleye Pollock Offal

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Abstract: Declining runs of Chinook salmon in western Alaska have focused interest on the ocean condition and food habits of Chinook salmon in the Bering Sea, including potential mortality from bycatch in the pollock fishery. Examination of Chinook salmon stomach contents collected in the eastern Bering Sea by the U.S. North Pacific Groundfish Observer Program (NOAA Fisheries) revealed isolated pieces of skin, bones, and fins (offal) belonging to large-bodied fish which were physically identified as either walleye pollock (*Theragra chalcogramma*) or Pacific cod (*Gadus macrocephalus*). To confirm the species identification of the offal, we matched DNA sequences of these offal samples to known sequences of walleye pollock and Pacific cod. Novel mitochondrial DNA (mtDNA) primers were designed to amplify a 174-base pair (bp)-long section of the cytochrome *c* oxidase subunit I (COI) gene, which was sequenced and compared with sequences downloaded from the GenBank database. Typically, much longer sections (~700 bp) of DNA are used for species identification but due to the state of digestion of the samples, long sequences of DNA were no longer present. The specific design of our primers, however, allowed us to make positive identification and differentiation of walleye pollock and Pacific cod. Of the 15 offal samples, nine yielded usable sequences, all of which were positively identified as walleye pollock. Our results clearly demonstrate the utility of a short COI sequence for species identification of Chinook salmon stomach contents that might otherwise be unidentifiable due to either the state of digestion, or because the salmon consumed isolated body parts (offal) rather than whole fish. These results suggest that walleye pollock offal supplements the diet of Chinook salmon during winter.

Keywords: Chinook salmon, walleye pollock, offal, genetics, food habits

INTRODUCTION

Understanding the ecology of a species is a fundamental component in developing conservation and management plans. Recent declines of Chinook salmon (*Oncorhynchus tshawytscha*) returns to western Alaska have prompted restrictions on commercial fishing (Hayes et al. 2008). Changes in abundance can often be attributed to variability in conditions during the marine life history (Botsford et al. 2002), yet there are large gaps in our understanding of the feeding ecology of Chinook salmon during their time at sea. Food habits studies are basic to gaining insights into salmon marine life history (Beamish and Mahnken 2001; Armstrong et al. 2008).

Stomach content analyses from Chinook salmon gathered in summer and fall in the North Pacific, Gulf of Alaska, and the Bering Sea indicate they feed primarily on fish and gonatid squids, although euphausiids, crab larvae, and other invertebrates can also be found in Chinook salmon diets (e.g., Volkov et al. 1995; Kaeriyama et al. 2004; Davis et al. 2005, 2009a; Volkov et al. 2007; Weitkamp and Sturdevant 2008). However, little is known about the food habits of

Chinook salmon at sea during winter, primarily because of the difficulty in conducting winter surveys.

Our samples were obtained from stomach samples collected by U.S. groundfish observers during the winter walleye pollock (*Theragra chalcogramma*) fishery in the eastern Bering Sea. Analysis of these samples revealed the presence of skin, flesh, fins, and bone (Davis et al. 2009b). Visual examination of skin pigmentation, fin and bone morphology, flesh consistency, and myotome structure revealed that among the possible prey species of Chinook salmon, walleye pollock and Pacific cod (*Gadus macrocephalus*) were the only reasonable possibilities. However, due to the condition of the tissues, further identification to the species level was not possible for all samples. Instead, we used genetic techniques to make positive species identifications.

Genetic identification is possible by comparing DNA sequences from unknown samples to those of known taxa. This approach can become quite costly if one must secure, extract, and sequence DNA from all possible candidate taxa. Although DNA sequences are available on public databases (GenBank), they often stem from different genes in different taxa, thus preventing direct comparison for species identifi-

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cation. In a recent standardization effort, Hebert et al. (2003) proposed that a single gene sequence was sufficient to differentiate between the majority of species on the planet and suggested using the mitochondrial DNA (mtDNA) gene, cytochrome *c* oxidase subunit I (COI). The COI gene has been termed the "barcode of life" and sequences from different species have been compiled in order to provide a database by which sequences from new or unknown species can be compared (Ratnasingham and Hebert 2007). This effort has been extended to fish (Ward et al. 2005), and COI sequences are now available for a wide variety of species on GenBank (www.ncbi.nlm.nih.gov) and on the Fish Barcode of Life database (www.fishbol.org; Ward et al. 2009).

Genetic tools have been used to determine the identification of prey species after partial digestion by amplifying relatively small (162 bp and 327 bp) sections of mtDNA (Parsons et al. 2005). Short sequences have also helped to identify highly degraded DNA samples using the barcoding gene, COI (Hajibabaei et al. 2006). In this study, our objective was to identify the fish species of offal found in the stomach contents of Chinook salmon. To achieve this objective, we developed novel primers for gene amplification of short DNA fragments, and compared those sequences to reference data from a public database (GenBank) and to positive control DNA samples from known species.

MATERIALS AND METHODS

Laboratory Analysis

Chinook salmon stomach samples were obtained from the winter pollock fishery during January to March, 2007 in the eastern Bering Sea and examined by Davis et al. (2009b). Offal refers to fish body parts (e.g., head, tail, spine, skin) that are discarded after processing. When Chinook salmon stomach contents were identified as fish offal they were collected and frozen at -20°C. In total, 15 samples were selected for genetic analysis (Table 1). Samples were thawed and divided into subsamples, which were then soaked in a 2% bleach solution to reduce contamination. To account for differing degrees of digestion present in each sample and the effect of bleach on our target DNA, we used two different soak times per sample. One subsample was soaked for 1 min and a second subsample for 3 min. After bleach soaking, each subsample was rinsed twice in distilled water and then preserved in a 95% ethanol solution according to the protocol outlined in Mitchell et al. (2007). This procedure reduced DNA contamination from Chinook salmon and other prey items by destroying the DNA in the external layers of the tissue.

A sample of walleye pollock positive control DNA was extracted from fin tissue (collected in the northeast Bering Sea) using the same protocol as that for the offal samples. Two Pacific cod positive control DNA samples were obtained from the study by Cunningham et al. (2009).

Offal DNA was extracted with a Qiagen DNeasy® micro-extraction kit following the manufacturer's protocol (Qiagen Inc., Valencia, CA). Novel primers were designed that amplified DNA from walleye pollock and Pacific cod in order to reduce the likelihood of contamination from other prey sources and from the salmon itself.

Walleye pollock, Pacific cod, and Atlantic cod (*G. morhua*) sequences were downloaded from GenBank and aligned in BioEdit (Ibis Biosciences, Carlsbad, CA). Primers were designed using Primer 3 (Rozen and Skaletsky 2000). The forward (5' – TTGGGATGGACGTAGACACA – 3') and reverse (5' – AGCCCCCAACTGTAAAGAGG – 3') primers amplified a 174-bp-long fragment of the mtDNA COI gene to avoid problems with amplification of large fragments from degraded DNA.

The reaction mixture comprised 20 ng of DNA, 1 X reaction buffer, 2 mM $MgCl_2$, 0.2 mM dNTPs, 0.5 µM forward primer, 0.5 µM reverse primer, and 0.5 U DNA Taq polymerase. The polymerase chain reaction (PCR) conditions were as follows: preheating at 94°C for two min; 40 cycles of 94°C denaturation for 30 sec, 55°C annealing for 90 sec, and 72°C extension for 90 sec; and a final 72°C extension for three min. The PCR products were examined on 1% agarose gels and directly sequenced in both directions with PCR primers on a high-throughput capillary sequencer at the University of Washington High-Throughput Genomics Unit (Dept. of Genome Science, University of Washington).

Table 1. Offal samples chosen for genetic testing, including month of collection and the tissue type analyzed. All samples were collected in the eastern Bering Sea during January to March, 2007. Offal, in this study, refers to fish body parts (e.g. head, tail, spine, skin) that are discarded after processing.

Sample No.	Collection Month	Tissue Type
8-20	February	Fin
20-9A	February	Bone and Muscle
28-11	February	Skin
43-28D	March	Fin
48-13A	March	Skin
50-7A	March	Fin
51-8A	March	Skin
52-2C	January	Skin
52-3A	January	Bone and Muscle
52-4	January	Skin
52-5A	January	Skin
59-13B	February	Muscle
59-16	February	Muscle
60-19	February	Muscle
84-16	March	Muscle

Data Analysis

The sequence fluorograms were aligned using Sequencher™ (Gene Codes Inc. Ann Arbor, MI). Low-quality base calls at the end of sequences were removed, and sequences were checked for consistency between forward and reverse sequences. Samples with low and/or confounding peaks in the sequence chromatogram were rejected. In addition to the fish offal sequence data, known sequences of walleye pollock (accession numbers AF081699 and DQ174028) and Pacific cod (accession number AF081697) retrieved from the GenBank database were included in the analysis as reference points to compare with our sequences. An Atlantic cod sequence (accession number DQ173997) was also downloaded from GenBank and included in our analysis as a genetic outgroup.

Phylogenetic analyses were conducted in MEGA4 (Tamura et al. 2007) using the neighbor-joining method (Saitou and Nei 1987) with Kimura two-parameter distances (Kimura 1980) including all three codon positions. In order to evaluate the reliability of the tree, bootstrap values were generated with 1000 iterations and only those values above 50 were reported and indicated at the nodes.

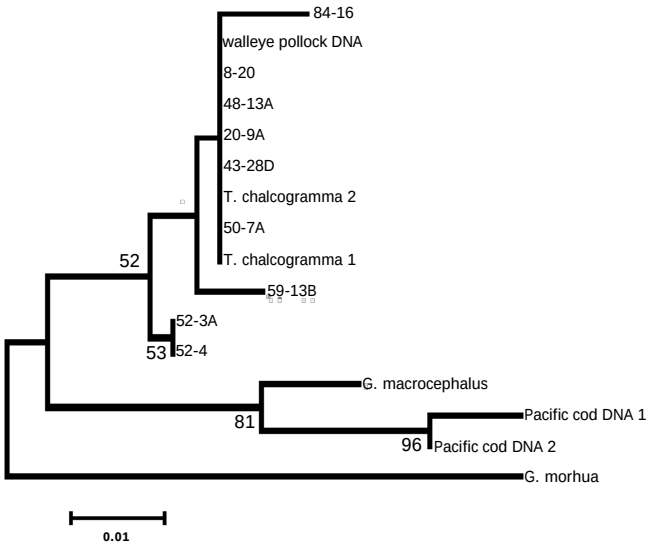

Fig. 1. Neighbor-joining tree showing the evolutionary relationship of nine offal sample haplotypes, three known DNA sample haplotypes and four known haplotypes (from GenBank). The tree is labeled as follows: walleye pollock = *T. chalcogramma* 1 (accession number AF081699) and *T. chalcogramma* 2 (accession number DQ174028); Pacific cod = *G. macrocephalus* (accession number AF081697); and Atlantic cod = *G. morhua* (accession number DQ173997). Offal sample haplotypes are labeled by sample numbers as in Table 2. Walleye pollock positive control DNA sample haplotype is labeled walleye pollock DNA (GenBank accession number GQ302982). Pacific cod positive control DNA sample haplotypes are labeled as Pacific cod DNA 1 (GenBank accession number GQ302983) and Pacific cod DNA 2 (GenBank accession number GQ302984). The tree was generated with Kimura two-parameter distances. Bootstrap values indicated at nodes were generated with 1000 replicates and only values above 50 are reported.

rESuLTS

All samples of positive control walleye pollock and Pacific cod DNA amplified with our primers and produced usable haplotypes. Additionally, nine of the 15 offal samples yielded usable haplotypes. Samples 28-11, 51-8A, 52-2C, 52-5A, 59-16, and 60-19 were amplified but rejected due to low and/or confounding peaks. Of those six rejected haplotypes, four were from skin samples (Table 1). However,

Table 2. Biological characteristics of Chinook salmon stomachs containing fish offal identified using genetic techniques. Sequences are available on the GenBank database and can be accessed using the GenBank accession number of each sample. Chinook salmon stomach samples collected by U.S. groundfish observers in the walleye pollock fishery operating in the eastern Bering Sea during January to March, 2007. Chinook salmon age determined from scales, where the number before (after) the period is the number of winters spent in fresh water (ocean). The X indicates that age could not be determined. Chinook salmon biological data and percentage of stomach content weight comprising fish offal from Davis et al. (2009b).

		Chinook Salmon					Fish Offal	
Fish Offal Sample No.	GenBank Accession No.	Sex	Maturity	Fork Length (cm)	Body Weight (kg)	Age	Species Identification	% of Stomach Content Weight
8-20	GQ302973	female	immature	44	0.94	1.2	pollock	100
20-9A	GQ302974	male	immature	52	1.67	1.2	pollock	100
43-28D	GQ302975	male	maturing	77	5.41	1.4	pollock	100
48-13A	GQ302976	female	maturing	82	5.92	1.4	pollock	100
50-7A	GQ302977	female	maturing	62	2.66	1.3	pollock	100
52-3A	GQ302978	female	immature	77	5.74	1.4	pollock	100
52-4	GQ302979	female	immature	47	1.6	X.X	pollock	54
59-13B	GQ302980	male	immature	59	2.34	1.2	pollock	95
84-16	GQ302981	female	immature	67	3.75	1.3	pollock	45

there was no obvious difference in DNA quantity among tissue types. No correlation was detected between the amount of DNA extracted and the duration of soak time in the bleach solution. The length of usable DNA sequences ranged from 108 bp to 152 bp but all sequences were trimmed to a length of 108 bp. Sequences were uploaded to the GenBank database (see Table 2 for offal sample accession numbers; see caption of Fig. 1 for positive control accession numbers). There was a total of 13 variable sites, four of which were diagnostic for differentiating walleye pollock from Pacific cod. Although our primers were designed to amplify DNA from both species, the neighbor-joining tree generated from the sequence data proved to be sufficient for differentiating the two (Fig. 1).

All offal haplotypes showed a closer relationship to the control sample of walleye pollock DNA and the walleye pollock sequences from GenBank than they did to the control samples of Pacific cod DNA and the Pacific cod sequence from GenBank, indicating the offal samples were in fact pieces of walleye pollock (Fig. 1). This relationship was supported by a bootstrap value of 52%. The Pacific cod positive controls were more closely related to each other (96% bootstrap value) and to the Pacific cod sequence (81% bootstrap value) than they were to any other sequence. All pollock samples were more closely related to Pacific cod than they were to the sequence of Atlantic cod from GenBank.

DIScuSSIoN

Nine of the fish offal samples collected from Chinook salmon stomach contents were identified as originating from walleye pollock (Table 2) due to their genetic similarities with known walleye pollock DNA and sequence data (Fig. 1). Those samples that did amplify but were rejected because of low and/or confounding peaks were likely contaminated by other contents of the stomach from which they were gathered. Four out of six of the rejected sample haplotypes were from skin tissue (Table 1), which was the thinnest tissue type. It is possible that the contamination from other stomach contents completely permeated the tissue. It is also possible that the exclusion of these samples may have introduced a degree of bias in our results, however, because the primary aim of this study was to demonstrate the presence of pollock offal, and not to quantify it, this possible bias is unlikely to have affected our results.

Our results clearly demonstrated the utility of a short COI sequence for species identification of Chinook salmon stomach contents. The specificity of our primer design was possible because morphological characters allowed the identification of offal as either cod or pollock. Further species identification was possible by sequencing the DNA and comparing results with known sequences. Much longer sequences are more typical for identifying species (Ward et al. 2009). The relatively short (108 bp) sequences are likely responsible for the low bootstrap values in the neighbor-joining tree (i.e., 52% for the grouping of all pollock together), but they were sufficient to distinguish two species and, importantly, they could be obtained from degraded DNA (Hajibabaei et al. 2006).

This technique may prove invaluable for identifying fish prey from stomach contents that might be unidentifiable due to the state of digestion, or when isolated body parts are consumed rather than whole fish. Future DNA research will focus on the development of techniques for identification of invertebrate salmon prey, such as cephalopods and cnidarians, which can be difficult to identify in the absence of fresh or intact specimens.

Our results suggest fish offal derived from pollock might supplement the diet of Chinook salmon during winter. The scavenging of commercially discarded fish parts has been well documented in seabirds (Bertellotti 2000; Garthe and Scherp 2003). However, consumption of offal by Chinook salmon has yet to be investigated for the possible changes in feeding strategy and behavior it may elicit in the affected populations. Currently, only direct mortality of Chinook salmon in the pollock fishery has been well documented (Berger 2008). Future research will be needed in order to determine the positive or negative consequences for Chinook salmon survival through the winter and the magnitude of the direct and indirect effects of offal consumption on the total population.

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EVALUATION OF PASSIVE INTEGRATED TRANSPONDERS FOR ABALONE: TAG PLACEMENT, RETENTION, AND EFFECT ON SURVIVAL

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ABSTRACT Since 1969, abalone populations have declined globally more than 50%, with many species now recognized as threatened, endangered, or species of concern. As monitoring progresses and restoration efforts evolve to include population supplementation, a reliable and robust method of tagging individual abalone is needed. Current abalone tagging methods are unsatisfactory, particularly for long-term studies as a result of tag loss, shell erosion, and encrustation. Observing tag numbers of cryptically positioned abalone can be difficult. To obviate these issues, we evaluated passive integrated transponders (PITs) as tags for pinto abalone (Haliotis kamtschatkana kamtschatkana). We applied 9-mm PITs with cyanoacrylate glue to the dorsal exterior of the shell and to the ventral anterior of the shell, and by injection into the foot muscle of small adults (trial 1), and applied PITs to the ventral anterior of the shell of juveniles (trial 2). We subsequently tracked growth, survival, and tag retention over 15 mo in trial 1 and 6 mo in trial 2 in captivity. Among small adults (trial 1), differences in relative growth rate and survival were not significant. PIT retention by adhesion to the ventral anterior and dorsal exterior was significantly greater than injection into the foot in trial 1. Between controls and tagged animals in trial 2, differences in survival were not significant. There was no significant difference in ventral anterior tag retention between trial 1 and trial 2. Gluing PITs on the ventral anterior of the shell is a promising method because abalone quickly formed nacre over the tags, incorporating them into the shell, which does not appear to affect tag detection by the PIT reader. Trials are underway to characterize PIT retention in natural habitats, to determine tag longevity, and to use PITs to track adults reintroduced to aggregations.

KEY WORDS: pinto abalone, Haliotis kamtschatkana kamtschatkana, passive integrated transponders, tag

INTRODUCTION

Mark–recapture—a system in which animals are removed physically from their environment, tagged with distinct numbers, and recovered in subsequent surveys—is a standard method in conservation biology to estimate population size, track migration patterns, and assess growth and mortality (Gibbons & Andrews 2004, Henry & Jarne 2007). Despite the fact that shelled gastropods can be tagged with limited invasiveness, a robust tagging technique is lacking (Henry & Jarne 2007), in part because of the limitations of cost, tag retention, effect on the animal, and efficiency of search for tagged animals. Existing tagging methods for marine gastropods, including abalone, share these limitations.

A robust tagging system would provide valuable data on abalone population dynamics. Abalone species worldwide are in decline, including pinto, white, and black abalone (Hobday et al. 2000, Rothaus et al. 2008, Neuman et al. 2010, Bouma et al. 2012). Many abalone species are surveyed actively by managers and remain the focus of restoration activities (Watson & Vadopalas 2009). Enumeration of abalone in the field is challenging because they are often nested in crevices of rocky substrate or are otherwise out of reach. Distinguishing individuals under these circumstances will empower researchers to detect abalone in situ. Thus, requirements for a successful tagging system for pinto abalone include the following characteristics: high retention rate, low impact on animal survival and health, and detectable under field conditions.

Although noninvasive individual tags such as plastic disks and numbered washers have been used to track growth and movement of shelled gastropods such as abalone, these tags have limited effectiveness (Catchpole et al. 2001, Henry & Jarne 2007). Such tags are difficult to read and may be overlooked at unacceptably high rates when the marked animal is in a cryptic microhabitat. Tags may be dislodged from the animal or may become unreadable without significant effort on the part of the observer as a result of erosion, decay, or encrusting epibionts, and may be difficult for divers to visualize underwater (Henry & Jarne 2007). Genetic tagging is feasible but can be costly and it does not provide the capability of immediate identification in the field (Henry & Jarne 2007).

Passive integrated transponder (PIT) technology may be a viable alternative to traditional tagging methods (Gibbons & Andrews 2004) if effects on the animal are minimal, tag retention is high, and the use of PITs increases the efficiency of search for tagged animals. PIT tags are small, biocompatible, glass-encapsulated integrated circuits that are activated by the PIT tag reader to relay the unique identifier number sequence (Wyneken et al. 2010). Since their first use in the mid 1980s (Gibbons & Andrews 2004), PITs have been used in a variety of taxa to answer a range of questions, from physiological to behavioral. PIT tags may increase identification efficiency greatly for marine gastropods as a result of their nonvisual detection technology, significant potential for longevity, and the potential to obviate recapture. PIT tags are essentially permanent if retained and can last up to 75 y or more (Biomark, Boise, ID), increasing accuracy and eliminating the need for retagging. In addition, the unique identifier code for each PIT tag reduces substantially the chance of identification error by storing tag number data in the PIT reader.

To address the limitations of traditional tagging methods, PITs were used experimentally to tag pinto abalone. We evaluated PIT tagging methods on both small adult (age, 3.5 y;

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mean initial shell length (SL, where SL is the maximum linear dimension of the elliptical shell), 59.3 mm; range, 40.1–75.5 mm) and juvenile (age, 2 y; mean initial SL, 23.6 mm; range, 17.5–32.1 mm) pinto abalone by assessing tag retention and tagging effects on growth and survival. Three methods were evaluated on small adult animals, including attachment of PITs to the dorsal exterior and ventral anterior of the shell, and foot muscle injection. PIT tag attachment on the ventral anterior of the shell was also evaluated in juvenile pinto abalone.

MATERIALS AND METHODS

Experimental Animal Care

Larval pinto abalone were produced and reared in a hatchery setting at the NOAA Mukilteo Research Station in Washington state. Abalone were held in culture tanks that received 20-mm-filtered, 8–14°C, ;30 PSU seawater, and were fed ad libitum naturally occurring benthic diatoms and macroalgae Nereocystis leutkeana and Palmaria mollis. Small adult abalone (adults; age, 3.5 y; mean initial SL, 59.3 mm; range, 40.1–75.5 mm) produced during fall 2007, including both males (n ¼ 17) and females (n ¼ 23), were used in trial 1. Juvenile abalone (juveniles; n ¼ 42; age, 2 y; mean initial SL, 23.6 mm; range, 17.5–32.1 mm) produced in 2009 were used in trial 2. The number of individuals in each trial was determined by the number of individuals available in each age class at the NOAA Mukilteo Research Station hatchery. For each trial described next, holding tanks were maintained at ambient temperatures from 8–14°C, with a mean temperature of 12°C. Handling, including tank cleaning, was minimized for 4 days after tagging to avoid further stress. Subsequent tank cleaning and feeding were conducted weekly.

Trial 1: Small Adults

Abalone were maintained in a 180-L fiberglass tank. Abalone (n ¼ 40) were removed from the tank and placed into submerged mesh bags to facilitate handling. Each animal was tagged initially with a 2-mm bee tag (The Bee Works, Orillia, Ontario, Canada) attached near the spire with cyanoacrylate glue (Zap-a-Gap; Pacer Technology, Rancho Cucamonga, CA). Abalone were assigned randomly to 4 groups (n ¼ 10 each) representing 3 tag treatments and 1 untagged control. After bee tag placement, control animals were returned to the common tank. We did not control separately for glue effects. PIT tags (9-mm full duplex, HPT9; Biomark) were adhered to the dorsal exterior of the shell in the groove formed below the respiratory pores (exterior; Fig. 1), the ventral anterior along the leading edge (interior; Fig. 1) of the shell using IC-GEL (Bob Smith Industries, Inc., Atascadero, CA), and injected into the lateral side of the foot muscle with a 12-gauge needle (MK10 Implanter, N215 needles; Biomark) (tissue, Fig. 1) in respective treatment groups. The injection site was sealed with cyanoacrylate glue. After tagging, abalone were placed in a 10-L bucket of seawater to cure the glue. After tagging, the individual identifier number from each tagged abalone was read with a PIT tag reader (601 Handheld Reader; Biomark), recorded, and matched with the individual's bee tag number. All abalone were returned to the 180-L common tank after tagging was complete. Survival and tag loss were monitored weekly for 15 mo. Initial and final SL was recorded for each individual.

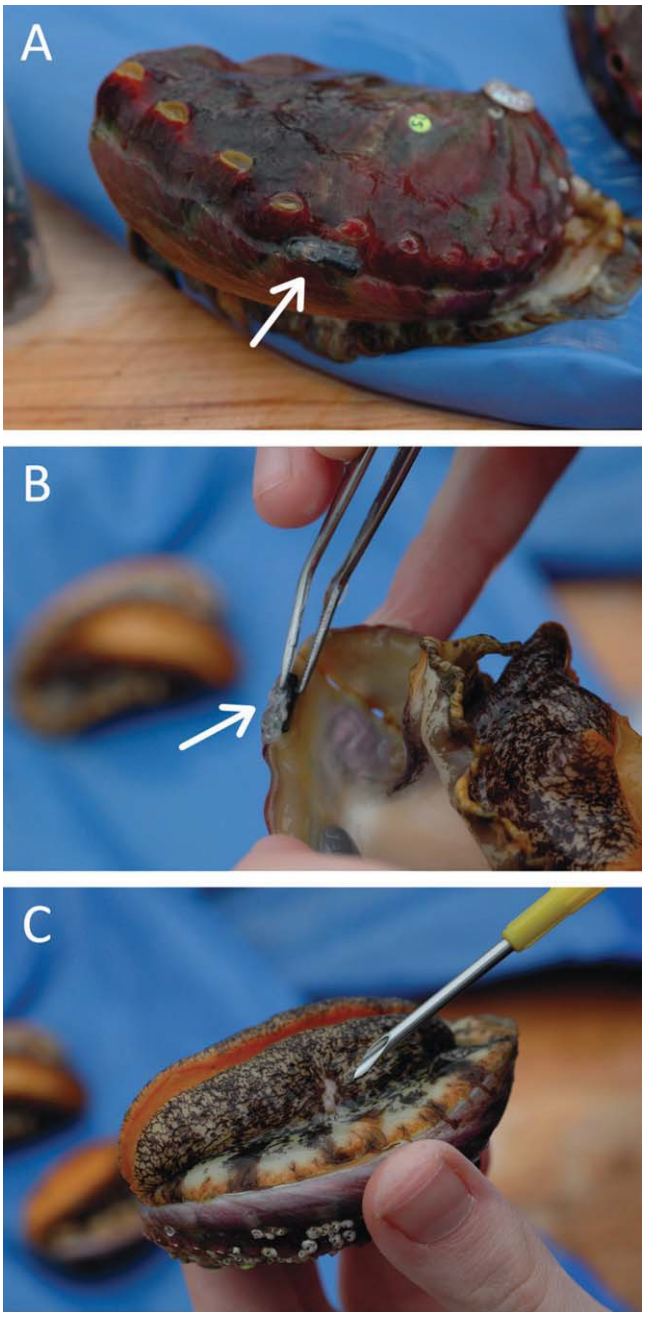

Figure 1. Application locations for passive integrated transponder (PIT) tags in pinto abalone (Haliotis kamtschatkana kamtschatkana). (A) Exterior. PIT tag (arrow) glued to the exterior of the shell in the groove formed by the respiratory pores. (B) Interior. PIT tag (arrow) glued to interior of shell after lifting up the mantle. (C) Injected. Needle points to the PIT tag injection site.

Trial 2: Juveniles

Juvenile abalone (n ¼ 42) were pretagged with bee tags as described earlier. Juveniles were assigned randomly to 2 groups (n ¼ 22 PITs, n ¼ 20 control). Those in the PIT tag group were tagged by gluing individual PIT tags to the ventral anterior of the shell as described earlier. After tagging, the individual identifier number from each tagged abalone was read with the

PIT tag reader, recorded, and matched with the individual's bee tag number. All abalone were returned to their culture tank for the duration of the study. Survival and tag loss were monitored weekly for 6 mo. Initial and final SL were recorded for each individual.

Statistical Analyses

Chi-square tests with Yate's continuity correction were used to determine whether survival and tag retention proportions differed among treatment groups, and to compare tag retention and mortality proportions between small adults and juveniles. To evaluate relative growth rate (RGR ¼ [ln SL2 – ln SL1]/[DTime]) differences among treatments in trial 1, we used single-factor analysis of variance (ANOVA).

RESULTS

Trial 1: Small Adults

Tag Retention

Tag retention differed significantly among groups (chi-square ¼ 18.37, df ¼ 2, P < 0.001). In PIT-injected abalone, tag retention was 10%. A single foot muscle tag remained in one abalone that later died after developing a large lesion protruding from the injection site (Fig. 2). Tag retention in internally and externally adhered PITs was 90% and 80%, respectively (Table 1).

Survival and Growth

Over a 15-mo observation period after tagging, 7 mortalities occurred. Mortalities occurred in all treatment groups except for the ventral anterior-adhered group. Mortalities occurred as follows: 1 animal in the externally adhered group, 4 in the injected group, and 2 controls. Survival was similar among treatments (chi-square ¼ 6.06, df ¼ 3, P ¼ 0.11; Table 1). Despite significant differences in SL among treatments at the beginning and end of the experiment (ANOVA, F ¼ 3.99, df ¼ 3, P ¼ 0.015; ANOVA, df ¼ 3, F ¼ 3.26, P ¼ 0.04, respectively), RGRs were similar among treatments (ANOVA, F ¼ 1.40, df ¼ 3, P ¼ 0.262).

TABLE 1.

Proportion survival and retention of PIT tags in pinto abalone, Haliotis kamtschatkana kamtschatkana.

Group	Treatment (n)	Duration (mo)	Retention	Survival
Small adult	Injected (10)	15	0.10	0.60
	Outside (10)	15	0.80	0.90
	Inside (10)	15	0.90	1.00
	Control (10)	15	—	0.80
Juvenile	Inside (22)	6	0.86	0.63
	Control (20)	6	—	0.85

Injected, tags inserted into the foot muscle; Inside, tags glued on the interior edge of the shell; Outside, tags glued to the exterior of the shell.

Response to PITs Adhered to Ventral Anterior of Shell

After 37 days, 1 abalone had covered the ventral anterior-adhered PIT with mantle tissue, and newly deposited nacre was visible covering the tag (Fig. 3). Similar observations occurred during the subsequent 60 days. All ventral anterior-adhered PITs in the remaining abalone in this treatment group were covered in nacre after 3 mo.

Trial 2: Juveniles

Tag Retention

Tag retention in juveniles was 86%; 3 of 22 juveniles lost their PIT (Table 1).

Survival and Growth

During the 6-mo observation period after tagging, 11 mortalities occurred. Mortalities occurred in both treatment groups, including 8 animals in the ventral anterior-adhered group and 3 controls. Survival was similar among treatments (chi-square ¼ 0.57, df ¼ 1, P ¼ 0.45; Table 1). No growth analyses were possible for trial 2 because of initial size differences between control and treatment groups (average initial SL, 20.7 mm and 23.9 mm, respectively) confounding

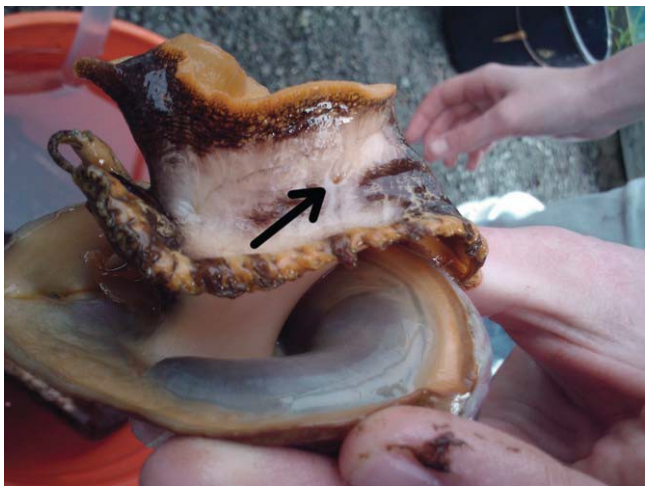

Figure 2. Pinto abalone, Haliotis kamtschatkana kamtschatkana, 61 days after injection with passive integrated transponder tag, showing large lesion protruding from the injection site (arrow).

Figure 3. Pinto abalone (Haliotis kamtschatkana kamtschatkana) 37 days after passive integrated transponder tag was glued to interior of shell under mantle tissue. This was the first observation of nacre deposition over the PIT tag (arrow).

growth analyses as a result of ontogenetic growth rate differences.

Response to PITs Adhered to Internal Shell

On observation (day 63 after tagging), 8 animals had abnormal epipodial tissue near the tagging site. In the majority of tagged animals, mantle tissue was either receded or up against the tag. Only a single subject animal in trial 2 had moved mantle tissue over the tag and deposited nacre over the PIT tag. On final observation, 178 days after tagging, 7 animals had abnormal shell growth near the tagging site (Fig. 4).

Small Adult and Juvenile Comparison

For the ventral anterior-adhered PITs, tag retention proportions were the same between the small adults (90%) and the juveniles (86%; chi-square ¼ 0.08, df ¼ 1, P ¼ 0.77). All tagged animals that died had retained their tag at the time of death. All small adults deposited nacre over PITs.

DISCUSSION

We developed a novel method for the attachment of PITs in abalone, and for the first time tested retention, growth, and mortality in a controlled environment. When PITs were applied to the ventral anterior shell in adult abalone, they became embedded in deposited shell (nacre), resulting in a high rate of tag retention and low associated mortality. Nacre-embedded tags decrease the probability of tag loss and likely reduce the possibility of tag damage from exposure.

Methods for tagging abalone have generally fallen into 2 categories (Prince 1991): tags applied with adhesives (Kraeuter et al. 1989, Debrot 1990, McShane & Smith 1992, Worthington et al. 1995, Henry & Jarne 2007) or tags secured to abalone respiratory pores (Prince 1991, Catchpole et al. 2001). Abalone have also been tagged chemically to alter shell color for identification of hatchery-reared individuals in the wild (Chick 2010). Henry and Jarne (2007) estimated that a tag loss rate of 0.01–0.1/mo is expected for most marking techniques, including adhesion of plastic tags, rivets, and various types of paint. Prince (1991) attached numbered disks to the respiratory pores of abalone with rivets, and observed tag losses of 4–35% over a 1-y period. Debrot (1990) tagged Cittarium pica, a marine snail, with a plastic disk glued with epoxy resin, and estimated a tag loss rate of 43% per year (Debrot 1990), which is much higher than the 10% tag loss we observed over 15 mo in small adults with ventral anterior-adhered PITs. Henry and Jarne (2007) hypothesized that tag loss in C. pica was a result of tag abrasion because of their crevice-dwelling habitat, similar to the habitat of many abalone species.

We found that abalone covered PIT tags with nacre, embedding the tag in the shell. Prince (1991) observed that 33% of animals that retained plastic rivet tags had covered the rivet with nacre after 1 y. In the current study, we observed 100% of the PITs embedded in nacre in the small adults after only 3 mo. The difference may be the result, in part, of the biocompatible characteristics of the glass encapsulation (Schott 2012) relative to nylon rivets, or the movement of the rivet against the respiratory pores. In freshwater mussels and the clam Mya arenaria, PITs inserted between the mantle and shell were also covered with nacre, further suggesting the possibility for long-term retention (Kurth et al. 2007; Hamilton & Connell 2009, respectively).

PITs circumvent many problems associated with visually encountering a variety of organisms and their tags in situ. Angeloni and Bradbury (1999) tagged the large marine ospithobranch Aplysia vaccaria with PITs, but did not record tag retention. Marine polychaetes were tagged successfully with coded microwire tags (Glycera dibranchiate and Nereis virens (Joule 1983)), as well as other marine invertebrates such as red king crabs (Paralithodes camtschaticus (Pengilly & Watson 1994)), lobsters (Homarus americanus (Ennis 1972), Panulirus argus (Sharp et al. 2000)), and prawns (Pandalus platyceros (Prentice & Rensel 1977)). Freshwater unionid mussels have also been tagged with PITs (Young & Isely 2008, Kurth et al. 2007, Wilson et al. 2011), resulting in 90–100% tag retention of externally attached PITs (Young & Isely 2008) and 75–100% tag retention of internally attached PITs (Kurth et al. 2007). Mussel reencounter rates were 72–80% with PIT technology compared with 30–47% by visual search methods (Kurth et al. 2007). Terrestrial invertebrates such as snails and beetles (Paryphanta busbyi watti and Plocamosthetus planiusculu, respectively (Lovei et al. 1997)), bees (Bombus terrestris and Apis mellifera (Riley et al. 1996)), ground beetles (Carabus coriaceus (Riecken & Raths 1996) and Calosoma affine (Wallin 1991)) have been tagged and tracked successfully with harmonic radar, a method similar to PIT tagging. In contrast to PITs, however, the reflected harmonic signal does not yield a unique identifier for each animal.

In the field, PITs have been used to tag black abalone (Haliotis cracherodii) by attachment to the external shell with both epoxy and cyanoacrylate cement. However, effectiveness was reduced by significant tag loss and consistent loss of PIT function after about 1 y (G. VanBlaricom, University of Washington, January 17, 2011, pers. comm.). Tags may have been rendered unreadable as a result of wave impact in the highly dynamic rocky intertidal habitat of black abalone (G. VanBlaricom, 2011, pers. comm.). Adult pink (Haliotis corrugata) and green

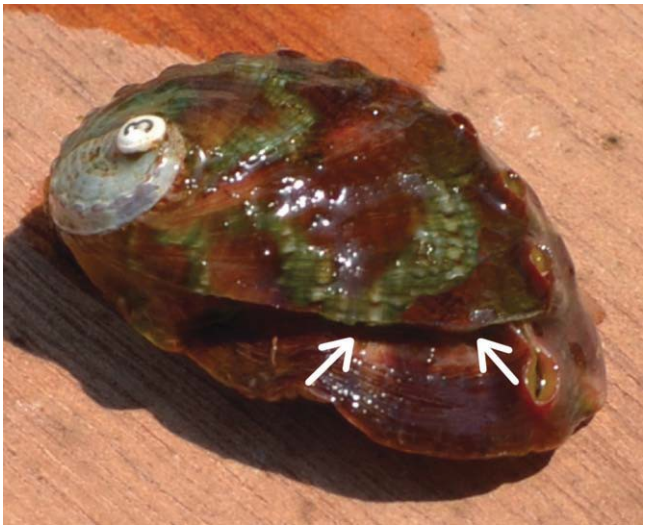

Figure 4. Shell malformation in juvenile pinto abalone (Haliotis kamtschatkana kamtschatkana) 6 mo after application of passive integrated transponder (PIT) tag (arrow) to the ventral anterior shell, likely the result of insufficient mantle to cover the PIT tag. As a result, shell growth occurred ventral to the tag, creating a ''shelf'' in the shell.

(Haliotis fulgens) abalone have also been tagged experimentally by attaching PITs with marine epoxy (Z-SPAR Splash Zone; Simco Coatings, Inc., Los Angeles, CA) to the external dorsal shell underneath a numbered stainless steel washer (I. Taniguchi, California Department of Fish and Game, March 29, 2012, pers. comm.). If incorporation via nacre deposition is similar to our observations for pinto abalone, ventral anterior PIT placement may optimize high retention rates in black, green, and pink abalone, and may reduce the impact of wave forces on PITs. Retention and survival rates for the PIT tagging method we describe for pinto abalone compares favorably with traditional methods used to tag hardshell gastropods. Based on our results, the majority of tag loss is likely to occur during the first 3 mo. After nacre deposition, we observed no tag loss; thus, we expect further tag loss to be minimal.

PIT-tagged abalone have been located in the field using handheld readers in combination with metal detectors in intertidal habitats (G. VanBlaricom, 2011, pers. comm.), PIT detection units (Kurth et al. 2007), and custom readers, including a reader (FS2001F-ISO Reader; Biomark) inside a custom underwater housing (PREVCO Subsea LLC, Fountain Hills, AZ) with a waterproof cable to a racket-style antennae (I. Taniguchi, 2012, pers. comm.). We are currently developing a fully submersible PIT tag reader in which the reader board and reader are fully encased in a waterproof container.

PIT tagging may not be a viable option for juvenile or small abalone. Although we observed low tag loss and low mortality in juveniles, 7 of the tagged juveniles exhibited abnormal shell formation (Fig. 4) that was not reflected in final SL measurements. In small abalone, the relatively large tag size combined with insufficient mantle tissue to cover the PIT may preclude tag assimilation. Concurrent with our experiments, large adult pinto abalone (mean SL, 115 mm; n ¼ 33) were also PIT tagged on the ventral anterior shell in 2011. After 6 mo, tag retention in this group was high (96%) and PITs were embedded in nacre (data not shown), illustrating the potential for tracking important broodstock in commercial and restoration abalone hatcheries.

A robust tagging system for pinto abalone would enable investigators to monitor the progress of restoration efforts that include aggregation and population supplementation, and to increase survey resolution for declining species, such as pinto abalone. In the short term, PIT tagging may be more expensive than some traditional methods (approximately $6/tag). However, PITs applied to the ventral anterior shell may ultimately prove cost-effective as a result of high retention and sustained readability. In addition, by obviating the need to encounter tags visually to confirm identification, PIT tags have the potential to increase the speed and resolution of surveys, providing valuable data on population dynamics in abalone species. Studies are underway to characterize PIT tag retention in natural habitats and to track adults reintroduced to the natural environment.

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Inside Higher Education
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New book challenges the idea that professors don't care about teaching

Professors usually don't make the best teachers, goes a common critique of higher education, especially those at research universities. But a new book challenges that argument, painting the professoriate as an overwhelmingly self-reflective group striving to achieve better learning outcomes over the course of their academic careers.

Inside the Undergraduate Teaching Experience [1], out this month from SUNY Press, is based on a qualitative study of 55 faculty members across different disciplines at the University of Washington, starting in 2009. Extensive interviews with the faculty members, a mix of those recommended by department chairs for exceptional teaching, those randomly selected, and those selected to demographically round out the group, reveal that virtually all faculty in all groups constantly think about how to be more effective teachers. Even when they didn't know they were doing it, professors described changing course assignments, content and student engagement strategies to improve learning outcomes. Much of that work was done experimentally, with professors using student behavior and performance as gauges of success.

"[Sometimes] I think my career is like 'Groundhog Day,' the movie – I have to keep doing this over and over again until I get it right," said one math professor. Another described her teaching as an "invasive species," making adaptations to changing environments in order to survive. The professors in the book are not named.

Catharine Beyer, a research scientist and lecturer in the Interdisciplinary Writing Program at the University of Washington, led the study, in part to see if largely positive student responses about their professors' concerns about teaching in a separate, longitudinal study on undergraduate learning were in line with professors' classroom experiences. While she expected the research to challenge some stereotypes about the professoriate, Beyer said she was stunned by the extent of professors' desires to be good teachers and their ongoing self-assessment – even when it was hard or painful.

"I was surprised by that, and frankly, really moved by it," said Beyer, "especially because that story kept repeating. No one spent time on one class, and said, 'O.K., I'm done,' and went on to [prepare for] the next class."

Indeed, even highly accomplished professors reported feeling anxious teaching classes they'd taught numerous times. "I have a terrible problem of over-preparing – over-preparing in such a way that I tend to paralyze myself," said one renowned legal scholar who reported consciously moving away from the lecture format. "I don't know where the discussion is going to go, so I feel that I have to be prepared to answer all possible turns of discussion and re-familiarize myself with the literature."

Co-author Gerald M. Gillmore, the now-retired, former head of the University of Washington's Office of Educational Assessment, said he wasn't surprised by the findings – but only because he'd had ample opportunity spanning his career to hear faculty discuss teaching. Such conversations disproved the "get back to the lab as quickly as possible" public image of professors, he said.

Beyer said she hoped the book would be read widely among professors, administrators, students and parents, to help bridge the gap between perceptions of professors at large, public research universities such as hers and the new reality. (Although the study was conducted at the University of Washington, she said she believed it was applicable to faculty at similar institutions as well as smaller universities and colleges.)

Teaching still has a long way to go, she said, but the public should "recognize and honor" the leaps and bounds professors have made during the last several decades, largely of their own volition, to move to a more student-centered approach to teaching.

Edward Taylor, the book's third author and dean and vice provost of undergraduate academic affairs and professor of educational leadership and policy studies at the University of Washington, said that although it may be hard for people to abandon the iconic image of a professor standing on a podium lecturing to thousands of students, the data reflect the changing nature of higher education. Learning environments and instructional styles are diversifying, and there's been a surge in research on pedagogy in higher education.

Institutions can encourage this trend by encouraging more pedagogical training in graduate programs, and increasing the value of teaching in tenure and promotion practices and in campus culture overall, Taylor said.

"What we need to do is move away from teaching and learning as a private practice," he said. "It's public work that should be learned with colleagues."

The book already has been endorsed by David Pace, professor emeritus of history at Indiana University at Bloomington and coeditor of *Decoding the Disciplines: Helping Students Learn Disciplinary Ways of Thinking*.

"The book captures the voices of faculty engaged in the classroom in a fashion that I have not seen before," he said in a publisher's blurb. "In the midst of a cacophony of works denouncing the professoriate as insensitive to problems of student learning (generally with little evidence), this study offers a glimpse into the real attitudes of a large group of instructors."

Ken Bain, who has written extensively about pedagogy in higher education and serves as the provost and vice president of academic affairs at the University of the District of Columbia, said he had not read the book, but that his own research supported its findings. "Indeed, for the last 30 years, there has been a quiet revolution taking place in higher education, in which increasing numbers of faculty recognize that there is valuable

research on university learning that can inform their practices. While some faculty remain outside that revolution, sticking to old approaches, a growing majority are deeply committed to a research-based approach to teaching and learning."

New Books About Higher Education [2]
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