STRATEGIES FOR BUILDING HUMAN CAPACITY FOR 21\textsuperscript{ST} CENTURY FISHERIES MANAGEMENT: A GLOBAL INITIATIVE

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INTRODUCTION
The world’s nations and regions, both developed and developing, confront significant and complex challenges in managing fisheries resources in the 21\textsuperscript{st} century. Is the current supply and range of training opportunities sufficient and capable of meeting the demand for effective 21\textsuperscript{st} century fishery management? To address this and other questions, the international workshop, \textit{Training Managers for 21\textsuperscript{st} Century Fisheries}, was convened in Queenstown, New Zealand, on December 5-7, 2001. This workshop brought together sixty-three recognized government, industry, academic, and non-governmental organization (NGO) leaders from Oceania, North America, and Europe. Speakers and participants addressed a wide range of issues, organized under five headings: 1) vision and management challenges of 21\textsuperscript{st} century fisheries; 2) requisite skills and knowledge; 3) current training and curricula; 4) incentives, responsibilities, and rewards to enhance recruitment and retention; and 5) consensus strategies. Participants developed a common vision, generated a list of general curriculum needs, suggested retention and recruitment barriers and solutions, and developed consensus strategies for addressing future training and education needs. The conference concluded with establishing an international steering committee charged with facilitating implementation of major recommendations and strategies. A full copy of the workshop report is available at: \url{http://oregonstate.edu/dept/trainfishmngr/report.html}

BACKGROUND
The 21\textsuperscript{st} century reveals a fishery management process experiencing unprecedented socioeconomic, environmental, and institutional challenges. Over the last fifty years, fisheries governance has rapidly evolved from primarily open access to regulated common property and rights-based institutions. Under the rubric of “sustainability”, 21\textsuperscript{st} century fishery managers are charged with balancing society’s conflicting needs with the unknown desires of future generations while employing vaguely defined concepts of precautionary and ecosystem-based management principles. Managers are also expected to accommodate an ever-widening range of community and industry “stakeholder” interests in the management and scientific process. The rapidly mounting legal and social pressures are grinding down fishery management systems and revealing fundamental flaws in governance and institutional design. These challenges require fishery managers who are expert problem solvers, leaders, and institutional innovators capable of working...
with a variety of stakeholders and advisors and addressing local, regional, national, and international management needs. Furthermore, as the definition of the “fishery manager” broadens in response to evolving institutions and increased participation in management, our understanding of training needs must also expand. These pressures are revealing an equally disturbing and related problem—society has not adequately invested in the human capital capable of co-designing and implementing the institutional structures which will lead to rational management of 21st century fisheries. The majority of fishery managers worldwide have received no formal academic training in fisheries management—for example, many government agencies have continued to promote biological scientists to key management positions. Few continuing education or academic programs exist that are designed to provide professional development training in fishery management and decision-making processes for the working fishery manager.

Past workshops on fisheries education have focused primarily on training scientists and technicians; but there has been some limited discussion on the inclusion of management skills and theory (Paulik 1968, Lackey 1979, Smoker 1981, UNESCO 1981, Amidei 1987, Ocean Studies Board, 2000). More recently, academic training in fisheries management has evolved to include varying degrees of multidisciplinary training in marine resource management, including courses in biology, economics, law, and policy, often with the goal of creating entry level professionals or broadly balanced research scientists. Although these programs offer a breadth of training which prepares graduates to facilitate a fishery management process, they rarely provide enough depth or focus to produce strategic and accountable managers who possess the requisite skills to successfully manage an organization and advance private and public welfare.

Many nations are also experiencing problems with recruitment and retention of quality managers. In the United States, for example, 30 to 45 percent of NOAA Fisheries (National Marine Fisheries Service) employees who are upper level scientists, managers, and administrators are estimated to be eligible for retirement in 2005 (Holliday 2001, Ocean Studies Board, 2000). Redesigning curricula and training programs may only be part of the solution to building human capital. Attracting people with the intellect and abilities requires a work environment that provides appropriate freedoms, responsibilities, and rewards. Unless provided an enabling and rewarding professional environment, talented managers will seek opportunities elsewhere, leaving fisheries with perfunctory administrators and second-rate managers.

VISION
The workshop group described a vision of 21st century fisheries which is a challenging and complex management future requiring a broad range of technical and leadership skills and abilities. There was no vision of a single “fisheries manager,” but consensus that depending on the governance system, there may be many “managers” in the fisheries process including stakeholders, stakeholder leaders, formal directors of private sector and NGO groups, mid-level government managers, elected policymakers, and policy analysts and institutional designers. Participants agreed the definition of fisheries manager has evolved to include many of the participants in the fisheries management process.
CURRICULUM
Workshop participants developed a comprehensive set of management skills and knowledge for effective management of fisheries. Participants emphasized the need for leadership qualities and skills related to leadership: communications, conflict resolution, decision-making, problem-solving, strategic planning, critical thinking, and systems analysis (including modeling and integrative multidisciplinary, holistic thinking). They also identified the need for more traditional skills, including analytical science skills, and knowledge of fisheries and related marine science, ecosystem science and management, economics, social science, policy, law, and business administration. Presentations and group discussion emphasized the need for skills in managing the interface between specialists and decision-makers, skills in incorporating indigenous and industry knowledge, and knowledge of all stakeholder groups.

Although the type and rigor of training should vary depending on the sector, management system, and management responsibilities, the participants reached consensus that management at all levels required interdisciplinary training in a broad range of science and management skills, reality-based classroom experiences, internships, and field practice. Group discussion highlighted some institutional or sectoral differences in training needs. There was varied opinion on whether training should occur primarily through academic programs, continuing education, or on-the-job training. Training needs and delivery methods specific to managers of different sectors, responsibilities, regions and nations should be further defined and developed as this task was beyond the scope of the workshop.

CURRENT TRAINING
The workshop included a presentation on current training capacity and examples of continuing education models. The current training review identified 72 academic programs (located in the United States, Canada, Australia, Japan, and Europe) offering 165 degree options (primarily postgraduate diploma or certificate, Masters, or Ph.D.) at a total of 46 institutions with at least some specific stated focus on fisheries management (Jodice and Sylvia 2001). Programs were discovered through an exhaustive search of online literature available in English. Regardless of degree title, most were primarily fisheries science programs. Only 20 percent of the programs emphasized leadership, decision-making, or critical thinking skills in their website literature. This stood in contrast to the leading business management, public administration, and natural resource or forestry educational programs which unanimously emphasized “capstone” integrated courses or requirements with emphasis on leadership, teamwork, and critical decision-making skills. While no single education program can be expected to provide all the necessary knowledge, skills, or expertise, there are significant components of top training programs which should be considered if the goal is to develop effective leaders and decision-makers for 21st Century Fisheries.

The review of current programs also identified four categories of continuing education programs where capacity could be further developed for training professionals and stakeholders at the mid or upper levels of fisheries management: 1) Academic-based—
extension and outreach education programs offering specialized, needs based workshops; postgraduate certificate, diploma or professional masters degree programs with flexible learning options; 2) Government—national agency based training center shared by several natural resource agencies; in-house training; 3) Industry—industry-based associations or trade groups for industry members; 4) Non-profit or foundation—professional societies; research foundations or institutes, other non-profits offering generic training in management.

Participants suggested that cooperative and innovative efforts within and among academia, government, industry, and NGOs could be highly beneficial toward developing new academic and continuing education opportunities. Communication and exchange of information on training opportunities and curricular resources within and across sectors should be enhanced through online communication and future workshops dedicated to specialized fisheries management training topics.

INCENTIVES AND REWARDS
Workshop participants emphasized that fisheries management as a profession is in crisis. Key symptoms of this crisis in agencies include—difficulty recruiting, high turnover, low retention, and the aging workforce. Several internal and external causes were identified, including limited professional development opportunities, low job satisfaction, perceived conflict between science and management disciplines, the political and, in some jurisdictions, litigious nature of fisheries management, and low morale. Participants also identified reluctance by non-agency stakeholders to engage in the fisheries management process because of past failure to achieve positive outcomes, or because they achieved better results through direct political approaches.

The group believed that given the challenges of fishery management, effective leadership requires a supportive working environment with appropriate responsibilities and rewards, including strategic incentives and ongoing professional education. In addition, promoting management successes and collaborative work between all stakeholders (agency and non-agency) could improve involvement in the management process. Creating an international association tasked with developing and promoting fisheries management as a profession could benefit this effort.

CONSENSUS STRATEGIES AND RECOMMENDATIONS
Workshop participants unanimously expressed a desire to continue working together to improve the education of fishery managers by focusing on the following consensus strategies:

1. Develop creative partnerships within and among institutions, sectors, and nations.
2. Include the management process as a learning experience.
3. Broaden and lengthen career paths.
4. Identify the gaps between those supplying and demanding management training.
5. Create a website which shares information about training programs and resources.
6. Encourage industry scholarships.
7. Develop a case study library similar to those created by the top business management programs.
8. Establish a network of training providers.
The group highlighted three areas for international cooperation: 1) exchanges in formal education of graduate students; 2) international internships and secondments for students and working managers; and 3) development of fishery management case studies.

An initial steering committee was formed at the workshop and additional members have joined as a result of a follow-up meeting held at the August, 2002, IIFET (International Institute of Fisheries Economics & Trade) Conference in Wellington, New Zealand. This committee, which now has international representation from academia, government, and industry, is currently developing plans for implementing and facilitating the workshop recommendations.

LITERATURE CITED


