



INTERNATIONAL SEAFOOD SUSTAINABILITY FOUNDATION

# ALLOCATION WORKSHOP

At the Bardessono Resort  
Yountville (Napa Valley) California  
February 11–13, 2011



## *SPONSORS:*

International Seafood Sustainability Foundation  
Center for Environmental Economics, Department of Economics, UCSD  
Institute on Global Cooperation and Conflict

# Welcome

to the Allocation Workshop, February 11-13, 2011  
in the Napa Valley region of California.

The purpose of the Workshop is to develop and explore different models of allocation, game theory principles and effects on self-enforcing agreements in international fisheries; **best practices from national and international catch share, TAC and other programs; and best practices from international water and atmosphere agreements.**

*Thank you all for your participation in this exciting exchange of ideas, data and insights.*

## AGENDA

### Thursday • FEBRUARY 10TH

6:00 pm                      Cocktails – Bardessono Private Dining Room  
6:45 pm                      Dinner – Bardessono Restaurant

### Friday • FEBRUARY 11TH

8:00 am – 9:00 am      Breakfast – Claro Room

Meeting Schedule      **BAY REDWOOD ROOM**

9:00 am                      Introductions

10:00 am                      Break

10:15 am                      **Framing of Issues for Workshop**

PANEL: Ted Groves, Dale Squires and Victor Restrepo

12:00 pm                      Lunch – Working lunch buffet will be served to  
conference participants in the meeting space

1:00 pm                      **Theoretical Approaches to Allocation of Common Property Resources**

*Chairs: Ted Groves and John Ledyard*

#### **PART 1: Game Theory/Mechanism Design**

PANEL: Don Saari, Simon Levin, Geoffrey Heal and John Ledyard

2:30 pm                      Break

2:45 pm                      **Theoretical Approaches (continued)**

#### **PART 2: Contracts and International Agreements**

PANEL: Scott Barrett and Joel Watson

4:30 pm                      **Roundup of Discussion**

5:00 pm                      Adjourn for evening

7:00 pm – 7:30 pm      Cocktails – Napa/Style, across the street from Bardessono

7:30 pm                      Dinner – Napa/Style



## Saturday • FEBRUARY 12TH

8:00 am – 9:00 am Breakfast – Claro Room

Meeting Schedule

**BAY REDWOOD ROOM**

9:00 am

**Allocation Models for Specific Resources**

*Chairs: Ted Groves and John Ledyard*

**PART 1: Water, Forests, etc.**

PANEL: Richard Carson, Mark Jacobsen and Josh Graff-Zivin

10:15 am

Break

10:30 am

**PART 2: Fisheries**

PANEL: Lone Kronbak, Dale Squires and Robert McKelvey

12:00 pm

Lunch – Working lunch buffet will be served to conference participants in the meeting space

1:00 pm

**International Allocation in Fisheries: Application and Experience**

*Chair: Victor Restrepo*

PANEL: Ray Clarke, Guillermo Compeán, Bill Fox, Bill Gibbons-Fly and Shingo Ota

3:30 pm

Adjourn for evening

5:15 pm

Meet in Bardessono's lobby to depart for tour, wine tasting and dinner at Rubicon Estate

## Sunday • FEBRUARY 13TH

8:00 am – 9:00 am Breakfast – Claro Room

Meeting Schedule

**BAY REDWOOD ROOM**

9:00 am

**Wrap-up: Further Discussion and Future Plans**

*Chairs: Ted Groves, Dale Squires and Victor Restrepo*

*All Participants*

12:00 pm

**Workshop Adjournment**

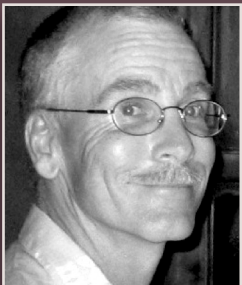
# PARTICIPANTS



**SCOTT BARRETT** is the Lenfest-Earth Institute Professor of Natural Resource Economics at Columbia University with a joint appointment in the Earth Institute and the School of International and Public Affairs (SIPA). He is also Vice Dean of SIPA. Among his outside appointments, he is a research fellow with CESifo (Munich), the Beijer Institute (Stockholm), and the Institute of World Economics (Kiel). He is currently on the boards of the Beijer Institute and Earth & Sky radio. His recent research has addressed a range of issues, including climate change, polio eradication, and malaria elimination. He is the author of *Environment and Statecraft: The Strategy of Environmental Treaty-Making* (2003; paperback, 2005) and *Why Cooperate? The Incentive to Supply Global Public Goods* (2007; paperback, 2010), both published by Oxford University Press. He was awarded the Erik Kempe Prize and the Resources for the Future Dissertation Prize, and received his Ph.D. in economics from the London School of Economics.

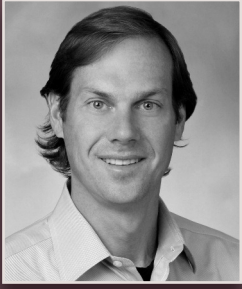


**RICHARD T. CARSON** is Professor of Economics at the University of California, San Diego. Carson served as President of the Association of Environmental and Resource Economists (AERE) and is an elected Fellow of AERE and of the Agricultural and Applied Economics Association. Carson received a Ph.D. in resource economics and M.A. in statistics from the University of California, Berkeley in 1985 and has an M.A. in international relations from George Washington University. He has extensive experience in assessing the benefits and costs of environmental policies. His specialty is valuing non-marketed goods and new commercial products using a wide array of techniques. Carson has done extensive work on water issues including the benefit assessment of the U.S. Clean Water Act for U.S. EPA. He was the government's principal investigator for the damage assessment of the Exxon Valdez oil spill. Carson has also done work on a number of other environmental issues including most recently Australian climate change policy, labor market impacts of arsenic contamination in Bangladesh, forecasting Chinese carbon dioxide emissions, and the impact of cyclical growth rates for fisheries management practices. He was recently named the most cited environmental economist in the world.



**RAY CLARKE** works for the National Marine Fisheries Service (NMFS), Pacific Islands Region International Fisheries Division, located in Honolulu, Hawaii. Current responsibilities include supporting the United States in terms of participation in the Western and Central Pacific Fisheries Commission, management and implementation of the South Pacific [purse seine] Tuna Treaty (a multilateral agreement the U.S. has with 16 Pacific Island Countries), along with providing technical support to the U.S. State Department Office of Marine Conservation on a variety of Pacific-related matters. Clarke has worked in a variety of capacities during his 26-year tenure with NMFS, from fishery observer in the Gulf of Alaska and Bering Sea, to biological researcher and modeler in the Northwestern Hawaiian Islands, to marine resources development specialist in Micronesia. He is married, has two teenaged children and resides on the North Shore of Oahu. He enjoys spending time with his family, running, surfing, swimming, paddle boarding, and gardening when he is not getting on and off airplanes or is tied to a keyboard on work-related matters.





**MICHAEL COHEN** is an Antitrust and Competition partner at Paul Hastings, where he chairs the firm's Global Competition practice. For the past twenty years his practice has focused on antitrust, trade regulation and competition law, excepting his years as a prosecutor pursuing criminal bank fraud convictions. Michael has represented parties to merger investigations in baby food, canned tuna, chemical, cold-rolled steel, digital media, entertainment, frozen potato, healthcare, motion picture, pet food, personal finance, portion-packing, publishing, radio broadcast, refined petroleum and software, industries, among others. He is a member of the bar of the United States Supreme Court, the United States Courts of Appeals for the Fourth Circuit and D.C. Circuit, the United States District Courts for the District of Columbia and Eastern District of Virginia, the United States Court of International Trade and the state bars of Virginia and the District of Columbia. He received his law degree from Washington & Lee School of Law in 1990, where he graduated magna cum laude, Order of the Coif and was Lead Articles Editor of the *Washington & Lee Law Review*.

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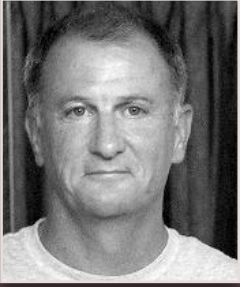


**GUILLERMO A. COMPEÁN JIMÉNEZ** is currently the Director of the Inter-American Tropical Tuna Commission. Compeán earned a B.Sc. in biology at the Universidad Autónoma de Nuevo León (México) in 1974, and an advanced degree in biological oceanography, with a major in fisheries biology, at the Université d'Aix-Marseille II (France) where he participated in tagging programs, sampling of landings, and aging of fish, in association with the tuna program of the Centre Océanologique de Bretagne. Compeán returned to México as Director of the Mexican Tuna Program and was associated with the Universidad Autónoma de Nuevo León, where he developed sampling programs and assessments of the longline fishery for yellowfin tuna in the Gulf of México. He developed and headed the Mexican Tuna-Dolphin Program and participated in the first tuna-farming operation on the Pacific coast of México and later served as the Director of the National Institute of Fisheries of Mexico.

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**WILLIAM FOX** began his career with NOAA's National Marine Fisheries Service (NMFS) in 1967 but from 1982 to 1990, he was Professor of Marine Biology & Fisheries at the University of Miami's Rosenstiel School of Marine and Atmospheric Science and Director of the University's Cooperative Institute for Marine and Atmospheric Studies. Fox rejoined NOAA in 1990 where he held positions as the Director of NMFS and Director of the NMFS Office of Science & Technology. In 2004 he became Director of the NMFS Southwest Fisheries Science Center, and has since also headed the U.S. scientific delegation to the International Scientific Committee for North Pacific Tunas and Tuna-like species, and was the chief science advisor to the U.S. delegations to the Inter-American Tropical Tuna Commission and Northern Committee of the Western and Central Pacific Fisheries Commission. Fox holds degrees from the University of Miami and the University of Washington – specializing in marine biological systems.



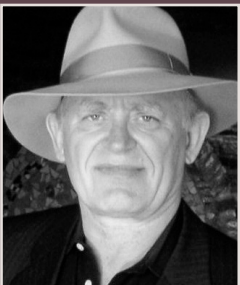
**BILL GIBBONS-FLY** has been the Director of the Office of Marine Conservation in the Bureau of Oceans, Environment and Science, U.S. Department of State since 2004. He has twenty-five years of direct involvement in the development and implementation of international environmental and oceans policy. Previous positions with the Department of State include Deputy Director of the Office of Marine Conservation, and Deputy Counselor for Environment, Science and Technology at the U.S. Embassy in Mexico City. Prior to joining the Department, he spent five years with the U.S. National Oceanic and Atmospheric Administration (NOAA), where he coordinated NOAA participation in a wide range of international scientific and technical organizations and agreements. Gibbons-Fly holds a Master of Arts in International Affairs from The George Washington University in Washington, DC and a bachelor's degree (with honors) in Environmental Studies from the University of California at Santa Barbara. He is a career member of the U.S. Government's Senior Executive Service and the recipient of numerous honors and awards including the Department of State's Superior Honor Award and Meritorious Honor Award.

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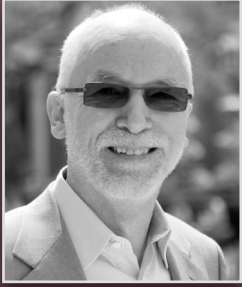


**JOSH GRAFF ZIVIN** is Associate Professor of International Relations and Pacific Studies and Affiliated Faculty of Economics. He is also a Research Associate at the National Bureau of Economic Research (NBER) and Research Director for International Environmental and Health Studies at the Institute for Global Conflict and Cooperation (IGCC). In 2004-2005, he served as Senior Economist for Health and the Environment on the White House Council of Economic Advisers. Prior to joining UCSD in 2008, he was an Associate Professor of Economics in the Mailman School of Public Health and the School of International and Public Affairs at Columbia University, where he served as the Director of the Ph.D. Program in Sustainable Development. Professor Graff Zivin has published numerous articles on a wide range of topics in top economic, policy, and medical journals. His research spans three fields of economics – health, the environment, and international development – and focuses on how uncertainty and heterogeneity affect both individual and societal decision-making. Policy relevance serves as a guiding force behind all of this work.

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**THEODORE GROVES** received his B.A. from Harvard and his Ph.D. in Economics from the University of California, Berkeley in 1970. Prior to coming to the University of California, San Diego (UCSD) as a Professor of Economics in 1979, he was a faculty member at the University of Wisconsin, Madison, Northwestern University's Kellogg School of Management, and Stanford University. He was a founder of mechanism design theory and the discoverer of the "Groves Mechanism," for eliciting truthful information in an incentive-compatible manner. He and co-author John Ledyard also developed the first general equilibrium solution to the "free rider problem" of public goods. He is the Director of the Center for Environmental Economics in the Department of Economics at UCSD and is involved in ongoing research on international and national fisheries, water pricing, and numerous projects for managing marine resources and the protection of endangered species. He is an elected Fellow of the Econometric Society and the American Academy of Arts and Sciences.



**GEOFFREY HEAL**, Paul Garrett Professor of Public Policy and Corporate Responsibility at Columbia Business School, graduate from Cambridge University and is noted for contributions to economic theory (including general equilibrium theory, social choice theory, the theory of choice under uncertainty and game theory) and environmental economics. Author of eighteen books and about two hundred articles, he is a Fellow of the Econometric Society, Past President of the Association of Environmental and Resource Economists, recipient of its prize for publications of enduring quality and a Life Fellow, a member of the Scientific Advisory Board of the Environmental Protection Agency and a Director of the Union of Concerned Scientists. Recent books on sustainability and the environment include *Nature and the Marketplace*, *Valuing the Future* and *When Principles Pay*. He chaired a committee of the National Academy of Sciences on valuing ecosystem services, was a Commissioner of the Pew Oceans Commission, and Chairs the Advisory Board of the Coalition for Rainforest Nations. He has been a principal in two start-up companies, is a Coordinating Lead Author for the IPCC and served as a member of the Investment Committee of an environmental private equity fund.

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**SUSAN JACKSON** is President of the International Seafood Sustainability Foundation. Prior to joining ISSF, Jackson was the Vice President for Government/Industry Relations and Seafood Sourcing for Del Monte Foods, where her responsibilities included government relations at the federal, state and local levels, and acting as Del Monte's representative to trade and industry associations. Jackson was also responsible for the purchase of all raw tuna and tuna co-pack manufacturing for Del Monte's StarKist brand. Jackson joined the H.J. Heinz Company in 1997 as an attorney in the law department, later working with the company's seafood sourcing and other areas of procurement. Jackson graduated with honors from The University of Notre Dame with a B.S. in Economics. She received her law degree from Duke University with high honors, Order of the Coif and served on the Duke Law Review editorial board.

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**MARK R. JACOBSEN** is an assistant professor of economics at the University of California, San Diego and a faculty research fellow at the National Bureau of Economic Research. His research focuses on environmental regulation, with particular attention to transportation and the distributional effects of policy. Jacobsen's work also includes a study of pollution permits in the Los Angeles basin and work on mitigating the effects of climate change via tradable emissions permits.



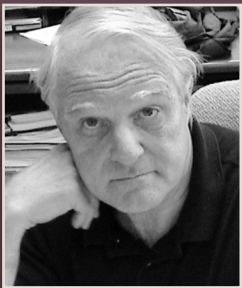
**LONE GRØNBÆK KRONBAK** is associate professor in applied microeconomics at the Department of Environmental and Business Economics, University of Southern Denmark. Her research fields lies within two areas, living marine resources, like fisheries, and pollution control. Her expertise includes cooperative and non-cooperative management under game theoretical modeling when externalities are present. In addition she has experience in carrying out economic evaluation of different management measures, in particular dealing with selectivity in fishery management. She has extensive experience in applying game theory to bio-economic models and is the author of a dozen peer-reviewed articles and book chapters on the topic.

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**JACOB LARIVIERE** is an Assistant Professor of Economics at the University of Tennessee. LaRiviere's research focuses on firm behavior in natural resource industries and government policy toward energy and the environment. He has presented his research findings throughout the US and in Europe. LaRiviere completed his Ph.D. in economics from the University of California, San Diego in 2010.

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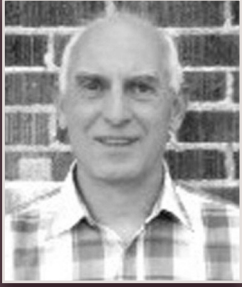
**JOHN O. LEDYARD** is the Alan and Lenabelle Davis Professor of Economics at the California Institute of Technology. He is a fellow of the Econometric Society, the Public Choice Society, and the American Academy of Arts and Sciences. Professor Ledyard's research is in the theory and application of mechanism design. His applied research includes market design for trading pollution emission rights, fishing rights, managing resources for spacecraft projects, reverse auctions for logistics contracts, swapping portfolios of thinly traded securities, and prediction markets.

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**SIMON LEVIN** is the George M. Moffett Professor of Biology and Director of the Center for BioComplexity. His research interests are in understanding how macroscopic patterns and processes are maintained at the level of ecosystems and the biosphere, in terms of ecological and evolutionary mechanisms that operate primarily at the level of organisms; in infectious diseases; and in the interface between ecology and economics. Levin is a Fellow of the American Academy of Arts and Sciences, and a Member of the National Academy of Sciences and the American Philosophical Society. He is a University Fellow of Resources for the Future, a Fellow of the Beijer Institute of Ecological Economics, and a Fellow of the Society for Industrial and Applied Mathematics. He has won the Heineken Prize for Environmental Sciences, the Kyoto Prize in Basic Sciences, and the Margalef Prize (2010) of the Government of Catalonia.





**ROBERT MCKELVEY** is a Professor Emeritus of Mathematics at the University of Montana where he was a mathematics professor since 1970. McKelvey has a B.S. in Physics, Carnegie Mellon University; a M.A. in Mathematics, the University of Wisconsin; a Ph.D in Mathematics, University of Wisconsin, and Postdoc in Applied Mathematics, University of Maryland. Recent articles include co-authoring in 2007 *The Incomplete Information: Stochastic Split-Stream Model – An Overview* for *Advances in Fisheries Economics*, co-authoring in 2006 *The Effects of Incomplete Information in Stochastic Common-Stock Harvesting Games* for *Advances in Dynamic Games: Applications to Economics, Management Science, Engineering, and Environmental Management*, and co-authoring in 2005 *Bi-national Management of a Transboundary Marine Fishery: Modeling the Destabilizing Impacts of Erratic Climatic Shifts* for *Environmental Economics*.

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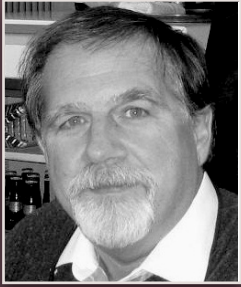


**ANDREAS MERKL**, Principal at California Environmental Associates, leads CEA's philanthropic services and sustainable investment practice areas, advising foundations on environmental strategy. Andreas has worked with most of the major environmental foundations and NGOs in the US on issues of biodiversity, fisheries, land conservation, and protected area finance. Currently, Andreas is leading an investigation for four large foundations focused on finding solutions to the global fisheries management issues, including the use of rights-based management by RFMOs. Most recently, he spent three years helping to found and build the ClimateWorks Foundation, and was intimately involved with the diplomatic and analytical challenges associated with the allocation of rights in the climate context. Andreas holds an MBA with distinction from Harvard University, a master's degree in Regional Planning and Natural Resource Analysis from UC Berkeley and a bachelor's degree in Environmental Sciences from UC Santa Cruz.

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**SHINGO OTA** is the Senior Fisheries Negotiator, International Affairs Division, for the Fisheries Agency of Japan (FAJ). Ota is also the Japanese Commissioner to the IATTC, the IOTC and Deputy Commissioner to ICCAT. He also served as the Chairman of the ICCCAT WG on Catch Documentation Scheme and was the Japanese Head of Delegation to negotiate the establishment of a new RFMO in the North Pacific Ocean. Previously at FAJ, he was the Deputy Director, Far Seas Fisheries Division, the Assistant Director, International Affairs Division, and Assistant Director, Fishery Marketing Division. Ota has a Bachelor of Fisheries from the University of Hokkaido and a Master of Marine Affairs from the University of Washington.



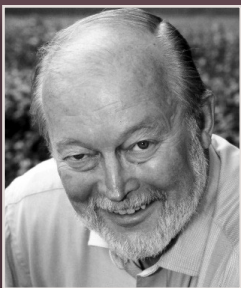
**JOSEPH POWERS** currently serves as a Professor of marine resource assessment in the School of the Coast and Environment, Louisiana State University. Previously he served as Senior Stock Assessment Scientist of the Southeast Fisheries Science Center, overseeing and conducting assessments for all regional assessments including red snapper, king mackerel and sharks. He also served as the senior US fisheries manager for the Southeast Region of the US. He has had extensive experience in conducting population dynamics studies, scientific stock assessments, in communicating results to constituents and managers, and serving as a fisheries manager. He has been the lead US scientist conducting stock assessments for Atlantic tuna and billfish species for the International Commission for the conservation of Atlantic Tunas (ICCAT). Additionally, Powers served as the Chairman of the Scientific Committee of ICCAT. His research interests continue to be the modeling of robust sustainable management procedures, integrating ecosystem factors into stock assessments, and game theory applications to fisheries management policy.

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**VICTOR RESTREPO** currently serves as Chair of the ISSF Scientific Advisory Committee. Previously, he worked with the International Commission for the Conservation of Atlantic Tunas (ICCAT). Restrepo has also served as the Chief of the NOAA/NMFS Sustainable Fisheries Division in the southeast USA, where he acted as head scientist of the USA Delegation to ICCAT. He has also spent time as a Population Dynamics Expert at ICCAT, as an Associate Professor at the University of Miami and as an IPA Research Specialist at the National Marine Fisheries Service's Office of Science and Technology in Silver Spring, USA. He has also attended numerous scientific meetings of ICCAT, ICES, NAFO, FAO and US, and chaired ICCAT working groups on Precautionary Approach and Stock Assessment Methods. In addition, he has also served as the Chairman of GFCM-ICCAT working group on Mediterranean Large Pelagic Fishes. Currently residing in Spain, Restrepo holds a Ph.D. in Population Dynamics from the University of Miami, as well as a BSc in Marine Science and Biology from the University of Miami.

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A product of the beautifully forested, most northern reaches of the Upper Peninsula of Michigan, **DON SAARI** received a 1967 Math Ph.D. from Purdue University. After a Post Doc in the Yale Astronomy Dept., Saari comfortably settled in at Northwestern University for the next 32 years where he was the Pancoe Prof. of Mathematics with honorary positions in Economics and in Engineering Sciences and Applied Mathematics. A shocking personal discovery was that it is not a mortal sin for a Lutheran to live in a warm, comfortable environment, inspired a move in 2000 to the University of California at Irvine where he is a Distinguished Prof of Economics and Math and the Director of the Institute for Mathematical Behavioral Sciences. Among academic honors, such as honorary Ph.D.s in economics, political science, and mathematics, he is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and, most fitting for his ethnic background, the Finnish Academy of Science and Letters. Saari's research interests start with dynamical systems, mathematical astronomy, evolutionary game theory, decision analysis, and mathematical economics, move to the mathematics of voting and aggregation/allocation procedures, and include, quite frankly, just about anything involving the mathematical modeling of the social and behavioral sciences.



**DALE SQUIRES** presently serves as the Senior Scientist and Economist for the National Marine Fisheries Service in La Jolla, California, as an Adjunct Professor of Economics at the University of California San Diego, and a member of the Scientific Committee of the International Seafood Sustainability Foundation. Squires served as a visiting scientist with the WorldFish Center, as well as on the U.S. Delegation to Renegotiate the South Pacific Tuna Treaty, a member of the FAO Technical Consultation on Global Tuna Purse Seine Capacity, and as the Pacific Fishery Management Council Leader of the Highly Migratory Species Plan Development and Management Teams. Squires was instrumental in the economics of capacity in the FAO International Plan of Action on Fishing Capacity, has written about 80 peer-reviewed papers, and co-authored or co-edited 6 books. His current research interests are the economics of the global tuna fisheries, the economics of conservation (especially transboundary sea turtles), and the impact of technical change in renewable resource models and management.

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**JOEL WATSON** is a Professor in the Economics Department at the University of California, San Diego. His research mainly addresses how contractual relationships are formed and managed, as well as the role that institutions play in enforcing contracts, using game-theoretic models. Watson's work addresses topics in a variety of applied areas, including law and economics, macroeconomics, labor economics, international economics, and environmental economics. He has authored numerous technical papers and a popular textbook on game theory (*Strategy: An Introduction to Game Theory*). Watson obtained his B.A. degree from UCSD and his Ph.D. from Stanford's Graduate School of Business. He spent two years at Oxford's Nuffield College before returning to UCSD as a faculty member. Watson was given the Economics Department Award for Excellence in Undergraduate Instruction in 2010. On the professional side, Watson co-founded and serves as the CEO of EconJobMarket.org, a non-profit (501c3) corporation that provides a central electronic repository for advertisements and application materials (including application forms, candidate-provided documents, and letters of recommendation) in the economics Ph.D. job market.





## ABOUT ISSF

Founded in 2008, International Seafood Sustainability Foundation is a global partnership among leaders in science, the tuna industry and WWF, the world's leading conservation organization. ISSF promotes the long-term conservation and sustainable use of tuna stocks through science-based initiatives, reducing bycatch and protecting the overall health of the world's oceans. Since inception ISSF has funded scientific research, provided expert testimony on sustainability issues and co-hosted international conferences on the importance of science-based initiatives to ensure the long-term health and sustainability of tuna. The ISSF Bellagio Conference on Sustainable Global Fisheries (May 2010) generated "Bellagio Framework for Sustainable Tuna Fisheries: Capacity controls, rights-based management, and effective MCS," which was a key background paper presented to the Kobe Process, through the Kobe Workshop hosted by the FFA from June 29 – July 1, 2010 in Brisbane, Australia. For more information about about ISSF, visit [www.iss-foundation.org](http://www.iss-foundation.org).

## ABOUT CEE, University of California, San Diego

The Center for Environmental Economics (CEE) promotes research in environmental economics and provides a community for scholars (faculty, graduate students, and others) interested in various topics on environmental economics. Research is organized by various Programs under the umbrella of the Center. For more information about CEE, visit [www.econ.ucsd.edu/CEE](http://www.econ.ucsd.edu/CEE).

## ABOUT IGCC

Institute on Global Cooperation and Conflict (IGCC) is a research unit serving the entire University of California system. IGCC researchers study a wide range of topics involving security, environmental, and economic policies that shape our ability to prevent conflict and promote cooperation across the globe. IGCC builds bridges between the theory and practice of international policy. For more information about IGCC visit, [igcc.ucsd.edu](http://igcc.ucsd.edu).

