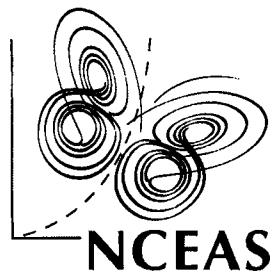


17 Feb 2001; Annual Meeting
of the American Association
For the Advancement of the
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SCIENTIFIC CONSENSUS STATEMENT ON MARINE RESERVES AND MARINE PROTECTED AREAS

THE CONTEXT

At the 1997 Annual Meeting of the American Association for the Advancement of Science (AAAS), a symposium on marine protected areas reviewed the state of the oceans, raised a number of unresolved critical scientific issues and identified research priorities. In response, an international team of scientists was convened at the National Center for Ecological Analysis and Synthesis (NCEAS) and charged with developing better scientific understanding of marine protected areas and marine reserves. Conclusions from the two-and-a-half-year efforts of this working group are *in press* in a special issue of the journal *Ecological Applications*. This Scientific Consensus Statement is based upon those results and other research already published elsewhere. The Statement is a joint effort of the NCEAS scientists and the academic scientists participating in a meeting on marine reserves convened by COMPASS (Communication Partnership for Science and the Sea). This Statement was drafted in response to repeated requests by many fishermen, marine resource managers, governmental officials, conservation activists, interested citizens and others for a succinct, non-technical but scientifically accurate summary of the current scientific knowledge about marine reserves. Additional information on the history of this Statement, NCEAS and COMPASS appears after the Statement.

New Approaches Are Needed:

The declining state of the oceans and the collapse of many fisheries have created a critical need for new and more effective management of marine biodiversity, populations of exploited species and overall health of the oceans. Marine reserves are a highly effective but under-appreciated and under-utilized tool that can help alleviate many of these problems. At present, less than 1% of United States territorial waters and less than 1% of the world's oceans are protected in reserves.

What are Marine Reserves?

Marine Reserves (MRVs) are areas of the sea completely protected from all extractive activities. Within a reserve, all biological resources are protected through prohibitions on fishing and the removal or disturbance of any living or non-living marine resource, except as necessary for monitoring or research to evaluate reserve effectiveness. Marine reserves are sometimes called “ecological reserves,” “fully-protected marine reserves,” or “no-take areas.” **MRVs** are a special category of **Marine Protected Areas (MPAs)**. MPAs are areas designated to enhance conservation of marine resources. The actual level of protection within MPAs varies considerably; most allow some extractive activities such as fishing, while prohibiting others such as drilling for oil or gas. **A Network of Marine Reserves** is a set of **MRVs** within a biogeographic region, connected by larval dispersal and juvenile or adult migration.

THE SCIENTIFIC CONSENSUS

The first formal marine reserves were established more than two decades ago. Recent analyses of the changes occurring within these MRVs allow us to make the following conclusions:

Ecological effects *within* reserve boundaries:

- 1) Reserves result in long-lasting and often rapid increases in the abundance, diversity and productivity of marine organisms.
- 2) These changes are due to decreased mortality, decreased habitat destruction and to indirect ecosystem effects.
- 3) Reserves reduce the probability of extinction for marine species resident within them.
- 4) Increased reserve size results in increased benefits, but even small reserves have positive effects.
- 5) Full protection (which usually requires adequate enforcement and public involvement) is critical to achieve this full range of benefits. Marine protected areas do not provide the same benefits as marine reserves.

Ecological effects *outside* reserve boundaries:

- 1) In the few studies that have examined spillover effects, the size and abundance of exploited species increase in areas adjacent to reserves.

- 2) There is increasing evidence that reserves replenish populations regionally via larval export.

Ecological effects of reserve *networks*:

- 1) There is increasing evidence that a network of reserves buffers against the vagaries of environmental variability and provides significantly greater protection for marine communities than a single reserve.
- 2) An effective network needs to span large geographic distances and encompass a substantial area to protect against catastrophes and provide a stable platform for the long-term persistence of marine communities.

**ANALYSES OF THE BEST AVAILABLE EVIDENCE
LEAD US TO CONCLUDE THAT:**

- ◆ Reserves conserve both fisheries and biodiversity.
- ◆ To meet goals for fisheries and biodiversity conservation, reserves must encompass the diversity of marine habitats.
- ◆ Reserves are the best way to protect resident species and provide heritage protection to important habitats.
- ◆ Reserves must be established and operated in the context of other management tools.
- ◆ Reserves need a dedicated program to monitor and evaluate their impacts both within and outside their boundaries.
- ◆ Reserves provide a critical benchmark for the evaluation of threats to ocean communities.
- ◆ Networks of reserves will be necessary for long-term fishery and conservation benefits.
- ◆ Existing scientific information justifies the immediate application of fully protected marine reserves as a central management tool.

This Scientific Consensus Statement is signed by 161 leading marine scientists and experts on marine reserves. Signatories all hold Ph.D. degrees and are employed by academic institutions. Names and affiliations of signatories appear on pages 5 - 12.

History and Purpose of this Statement

This Statement was drafted in response to repeated requests by many fishermen, marine resource managers, governmental officials, conservation activists, interested citizens and others for a succinct, non-technical but scientifically accurate summary of the current scientific knowledge about marine reserves.

The Statement is based on work conducted primarily by the NCEAS Working Group on Marine Reserves, co-chaired by Jane Lubchenco, Stephen R. Palumbi and Steven D. Gaines. The National Center for Ecological Analysis and Synthesis (NCEAS - <http://www.nceas.ucsb.edu/>) is a scientific institution funded by the National Science Foundation, the State of California and the University of California, Santa Barbara. The mission of NCEAS is to advance the state of ecological knowledge through the search for general patterns and principles and to organize and synthesize ecological information in a manner useful to researchers, resource managers, and policy makers addressing important environmental issues. The Working Group on Marine Reserves (WGMR) was convened in May 1998 following a Symposium on The Science of Marine Protected Areas at the Annual Meeting of the American Association for the Advancement of Science (AAAS) in February 1997. Products from the Working Group have been published or are *in press* in peer-reviewed scientific journals.

The initial version of this Scientific Consensus Statement was drafted in August 2000 at a meeting on “The Science and Development of Marine Protected Areas and Fully Protected Marine Reserves along the U.S. West Coast” held in Monterey, California. The meeting was organized and sponsored by COMPASS (<http://www.CompassOnline.org/>), the Communication Partnership for Science and the Sea, a collaboration among Island Press, SeaWeb, Monterey Bay Aquarium and an independent Board of Scientific Experts. The mission of COMPASS is to advance and communicate marine conservation science. Dr. Megan Dethier and Dr. Stephen R. Palumbi coordinated the academic scientist group which drafted the initial Statement at the Monterey COMPASS meeting, following presentations by NCEAS Working Group scientists.

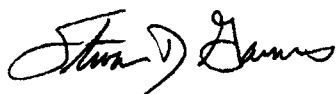
The intended audience for the Statement includes resource users, policymakers, non-governmental organizations, and interested citizens. Signatories are academic Ph.D. scientists with expertise relevant to reserves.

For further information about NCEAS, COMPASS, the Statement, a list of scientific products from the NCEAS Working Group on Marine Reserves or to add your name for future use of the Statement, please contact Dr. Patty Debenham pdebenham@nceas.ucsb.edu or Dr. George Leonard gleonard@mbayaq.org.

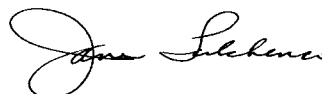
**An electronic version of this Statement is available at
<http://www.CompassOnline.org/> or
<http://www.nceas.ucsb.edu/Consensus>**

Initial Signatories

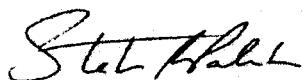
(Members of the NCEAS Working Group on Marine Reserves and Participants in the Academic Scientist Group at the COMPASS Monterey Meeting on Marine Reserves)



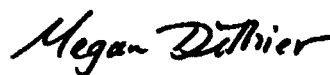
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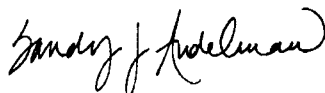
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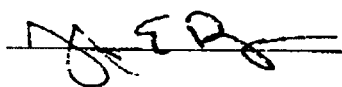
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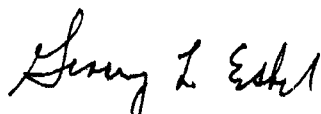
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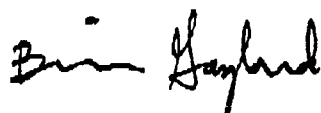
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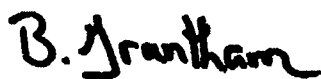
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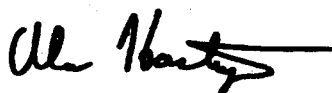
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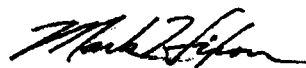
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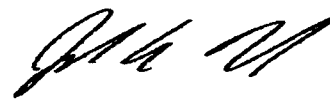
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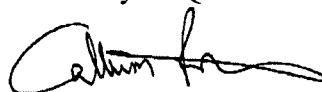
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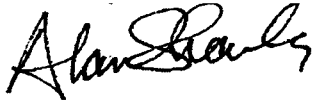
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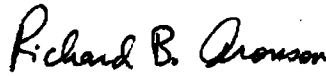


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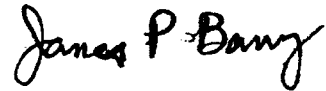
Additional Signatories



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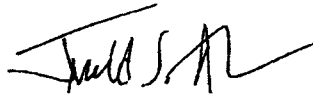
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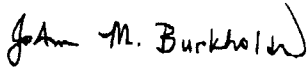
William J. Ballantine
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JoAnn M. Burkholder
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Leo Richard Bodensteiner
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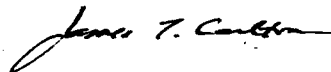
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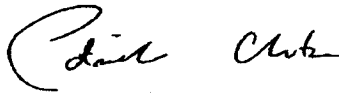
Emily Carrington
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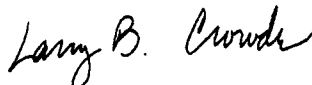
Patrick Christie
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Benjamin E. Cuker
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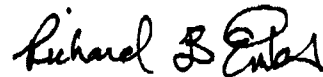
Paul A. Dinnel
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David Duggins
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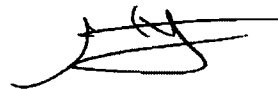
Phillip Dustan
College of Charleston



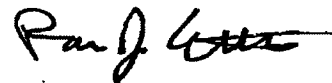
Richard Bono Emlet
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Roberto R. Enriquez
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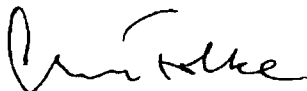
Marta Estrada
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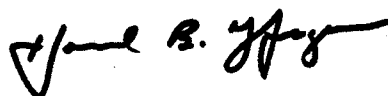
Ron Etter
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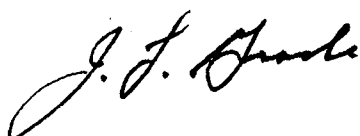
Miriam Fernandez
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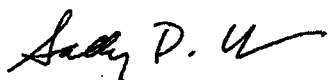
J. Frederick Grassle
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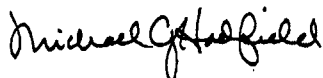
Judith P. Grassle
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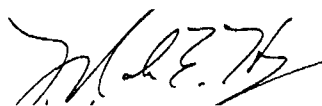
Sally D. Hacker
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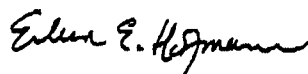
Mark E. Hay
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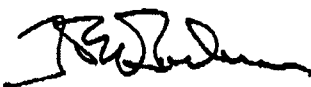
Brian Helmuth
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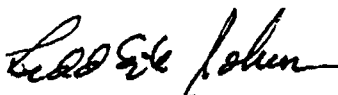
Helen Hess
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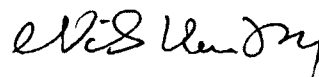
Ladd Erik Johnson
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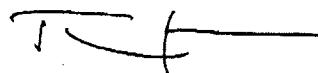
Ron Karlson
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Les Kaufman
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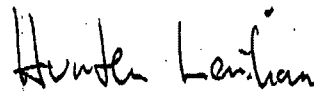
Terrie Klinger
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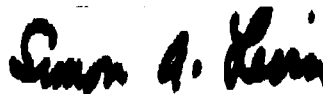
Nancy Knowlton
Scripps Institution of
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Simon A. Levin
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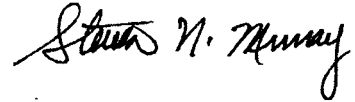
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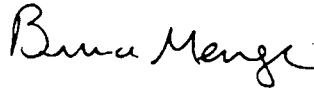
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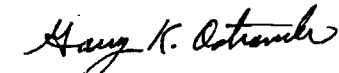
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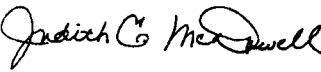
Jerry McCormick-Ray
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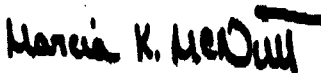
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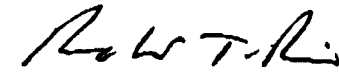
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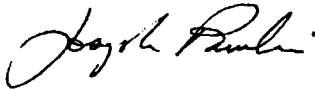
Gustav Paulay
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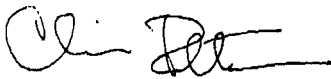
Charles Henry Peterson
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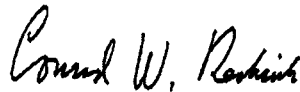
G. Carleton Ray
University of Virginia



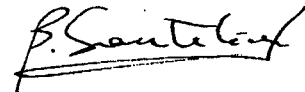
Eric Sanford
Stanford University



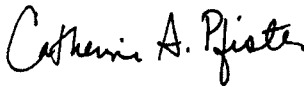
Christopher W. Petersen
College of the Atlantic



Conrad W. Recksier
University of Rhode Island



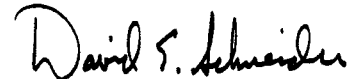
Bernabe Santelices
Pontificia Universidad Catolica
de Chile



Catherine Ann Pfister
University of Chicago



Daniel C. Reed
University of California,
Santa Barbara



David E. Schneider
Western Washington University



Stuart Pimm
Columbia University



Michael A. Rex
University of
Massachusetts
Boston



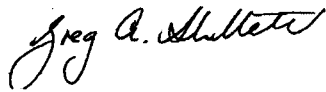
Daniel Simberloff
University of Tennessee



Tony J. Pitcher
University of British
Columbia



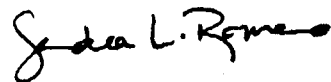
Robert H. Richmond
University of Guam



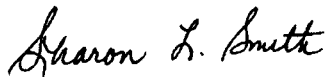
Greg A. Skilleter
University of Queensland



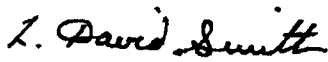
Gerry Quinn
Monash University



Sandra L. Romano
University of the Virgin
Islands



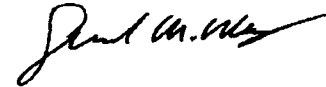
Sharon L. Smith
University of Miami



Leslie David Smith
Northeastern University



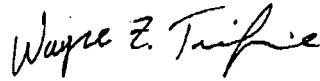
Joseph Travis
Florida State University



Gerald M. Wellington
University of Houston



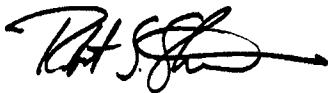
George N. Somero
Stanford University



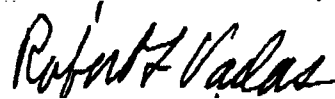
Wayne Z. Trivelpiece
Montana State University



Michael C. Whitlock
University of British Columbia



Robert S. Steneck
University of Maine



Robert L. Vadas, Sr.
University of Maine



Susan L. Williams
University of California,
Davis



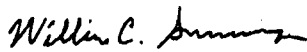
Suzanne Strom
Western Washington
University



Kathryn L. Van Alstyne
Western Washington
University



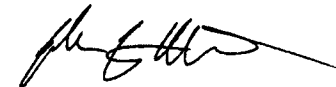
A. O. Dennis Willows
University of Washington



William C. Summers
Western Washington
University



Cindy Lee Van Dover
The College of William
and Mary



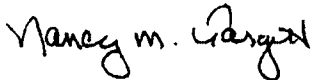
J. Timothy Wootton
University of Chicago



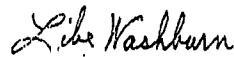
Craig Syms
University of California,
Santa Cruz



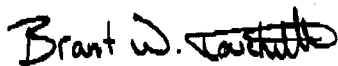
Amanda Vincent
McGill University



Nancy M. Targett
University of Delaware



Libe Washburn
University of California,
Santa Barbara



Brant W. Touchette
North Carolina State
University



Les Watling
University of Maine