

**Independent  
Multidisciplinary  
Science Team  
(IMST)**



**State of Oregon**

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February 9, 2015

Richard Whitman  
Governor's Natural Resources Office  
255 Capitol St. NE, Suite 126  
Salem, Oregon 97301

Dear Richard,

On January 15, 2015 the Independent Multidisciplinary Science Team (IMST) held a technical workshop on scientific review in Oregon. The overall goal of this workshop is to provide the Governor's Natural Resource Office (GNRO) with additional information as it considers a broader role for scientific review in Oregon. Attached is the workshop summary.

Invited workshop participants brought relevant experience and information related to science review processes and panels. Participants worked with IMST members to summarize science review needs in Oregon and pros and cons associated with various review panel models.

The objectives of this workshop were three-fold:

1. Determine the relevant scope of natural resource programs that could benefit from scientific review in Oregon.
2. Review and discuss pros and cons of operating models for scientific review used in Oregon and elsewhere.
3. Provide the participants' recommendations on sound operating model(s) to the GNRO and state legislative committees for their consideration in future discussions.

Based on discussions at the workshop and 18 years of experience with IMST, current and previous members are developing formal recommendations regarding a possible new science review panel in Oregon. These recommendations will be sent to Governor Kitzhaber and later this week. As always, we would be pleased to discuss this report with you and your staff.

Sincerely,

Carl Schreck

Bob Hughes

Alan Yeakley

# **Scientific Review in Oregon: A Summary of the Independent Multidisciplinary Science Team's Technical Workshop**

**Released on February 9, 2015**



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**Independent Multidisciplinary Science Team**  
Oregon Plan for Salmon and Watersheds  
<http://www.fsl.orst.edu/imst>

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## **TABLE OF CONTENTS**

<b>EXECUTIVE SUMMARY .....</b>	<b>i</b>
<b>WORKSHOP OBJECTIVES .....</b>	<b>1</b>
<b>BENEFITS OF SCIENTIFIC REVIEW .....</b>	<b>1</b>
<b>PROS &amp; CONS OF EXISTING MODELS.....</b>	<b>5</b>
<b>WORKSHOP FINDINGS AND INSIGHTS.....</b>	<b>7</b>
<b>REFERENCES.....</b>	<b>10</b>
<b>Appendix 1. Workshop participants and their affiliations .....</b>	<b>12</b>
<b>Appendix 2. Summary of SB202.....</b>	<b>13</b>

## **EXECUTIVE SUMMARY**

This report synthesizes the findings of a workshop, held by Oregon's Independent Multidisciplinary Science Team (IMST) in January, 2015, to discuss state-level science review and how to best formulate a panel to conduct scientific review of a broad suite of natural resources management activities for the state of Oregon. Invited participants included representatives of most of the state's natural resource agencies as well as others with familiarity of review systems. The workshop identified numerous benefits of scientific review, grouped in four categories: the benefits of the scientific process; a contribution to more ethical behavior; an ability to overcome institutional limitations; and the role in helping inform and facilitate policy decisions. The workshop compared and contrasted five different models of scientific review that operate at either state or national levels. Aspects of the panels that were compared included: appointing authorities; committee selection criteria and process; funding sources; productivity; level of financial support for staff and panelists; and peer review requirements.

Workshop participants felt that retention of a standing core of panelists was important to retain an effective level of institutional memory. The appointment process would be self-nominated (following a call for nominations from appropriate scientific societies) but reviewed or screened by those scientific societies. It was deemed important to have high-level political support (approval by the Governor and Legislative Assembly) and funding for a state science review panel, but it was also recommended to have a short time limit (thirty to sixty days for the appointments to be made following delivery of the files of the finalists to the appointing authorities), after which the default would revert to the existing independent multidisciplinary science panel to appoint new panelists.

In addition to paid core science review panelists, it was deemed useful for the team to have the flexibility of appointing ad hoc, temporary panelists when the particular scientific needs were outside the expertise of the core panelists.

The science review panel is expected to be reviewing a wide range of local and state natural resource agencies and natural resource issues, and therefore a broad range of both natural and social scientific expertise should be represented by the standing body of panelists. Panelists should not be limited to Oregon residents. Also, the panel should represent a wide array of perspectives and values and these should not be viewed as conflicts of interest. Conflicts of interest should be restricted to direct or indirect sources of financial gain, assessed by the panel at the time a project or review is initiated.

Because there is a continuum of scales from ground-level project permits to state-level policies, it is important to indicate how scientific review informs and adds value to both levels and whether the panel will focus on both these scales or primarily only one. It was recommended that the science panel itself develop its own written guidelines regarding how requests for reviews are posed, refocused by the panel if necessary, prioritized, and rejected. Likewise, the panel should determine which reports and reviews should receive outside peer review and how those reviews should be conducted (i.e., blind versus open).

An independent multidisciplinary science panel must be accessible to private citizens and nongovernmental organizations; therefore review requests should be welcomed from both

governmental and non-governmental entities. It would be useful for the panel to have a public outreach specialist available to aid in this process.

The panel should receive a base level of funding from the state, and if the staff is housed at a university, the infrastructure costs can be lowered via low indirect cost rates. The cost burden of the panel, however, should be born primarily by state resources, not the universities. It is unreasonable to expect panelists to work many hours on projects or reviews for free or for the universities to support the panelists' hours or salaries. In addition, regardless of where the staff is housed, it is important to have panelists from other institutions to avoid the impression that the panel is a university think tank.

## **WORKSHOP OBJECTIVES**

On 15 January 2015, Oregon's Independent Multidisciplinary Science Team (IMST) convened a workshop to discuss science review in the State of Oregon and to envision the composition of a state-level science review board to evaluate new management and research approaches to natural resource challenges in Oregon. See Appendix 1 for a list of participants. The three main objectives for the workshop were to:

- Determine the benefits of independent, multidisciplinary scientific review to natural resource programs in Oregon and elsewhere.
- Review and discuss pros and cons of pertinent models for scientific review used in Oregon and elsewhere.
- Provide recommendations on a sound operating model to the Governor's Natural Resource Office and to the Legislative Assembly for their consideration in future legislation and planning.

## **BENEFITS OF SCIENTIFIC REVIEW**

There are numerous benefits in having an independent, multidisciplinary scientific review panel focused on natural resource conservation and management. Here we group those benefits under four somewhat overlapping headings: scientific process, ethics, institutional limitations, and policy.

### Scientific Process

- Science forms a major foundation of western culture, and thus it is critically important that it be conducted as effectively as possible. An independent, multidisciplinary review is an established process for increasing scientific accuracy, reliability and usefulness.
- The scientific approach to knowledge and decision-making depends on the free and open exchange of information dependent on open review and disagreements (Bella 1992). An independent, multidisciplinary review process can help expose those differing scientific opinions and perspectives.
- Frequently a natural resource agency lacks all the necessary expertise needed for sustainable resource management. A scientific review panel can invite review by outside experts and disciplines (including from other states and other countries) to provide a more robust analysis of the success of state management strategies and to suggest alternative approaches that have worked elsewhere.
- As science and technology evolve and yield new scientific understanding and impose emergent environmental hazards, and as climate changes and population and economic pressures mount, an independent scientific review panel can assist agencies in identifying new, forward-thinking strategies to cope with these new pressures and

threats to ecosystem condition.

### Ethics

- Resource agency employees should consider themselves as fiduciary trustees of a natural trust, protecting those resources for current and future generations, as opposed to mere permitting agents (Wood 2014). An independent, multidisciplinary review process can help ensure that those trust resources are considered and protected.
- Employees in resource management agencies have ethical obligations to the managed resources, to the public, to future generations, and to their employers. Sometimes, however, employer obligations (e.g., short term priorities, avoiding offending a supervisor and losing a job) trump the other, longer-term obligations to the overall integrity of a given ecosystem (Hughes 2014b). An independent, multidisciplinary review process can help reduce that apparent or actual bias.
- When knowledgeable scientists remain silent, despite having scientific knowledge that supports an alternative resource management position, it can result in continued resource degradation (Hughes 2013). An independent, multidisciplinary scientific review process can help ensure that those alternative positions are considered.

### Institutional Limitations

- Like most people, agency scientists and managers are basically honest and dedicated; however, their perspectives, viewpoints and scientific and management expertise are constrained by their disciplinary foci and agency missions. Therefore, their perspectives and expertise often are formed without a robust understanding of how to measure resiliency, disturbance magnitude, and sustainability of natural resource systems. An independent, transdisciplinary scientific review process can help broaden those perspectives.
- Resource agencies often focus on a single ecosystem component and a limited number of stressors and pressures leading to depleted ecological condition. An independent, multidisciplinary scientific review process can help ensure that those various components, stressors, and pressures are considered.
- Resource agency programs and positions are developed, sustained, and promoted that tend to select information favorable to those agencies. Contrary information is often filtered out (Bella 1992). An independent, multidisciplinary review process can introduce and examine alternative information.
- Politicians and resource managers occasionally misrepresent, ignore, or are unaware of scientific findings and conclusions. An independent, multidisciplinary scientific review process can help ensure that those findings and conclusions are represented.
- Institutions tend to manipulate and/or selectively represent scientific information that supports their extant policy positions (Bella 1992). An independent, multidisciplinary review process can help expose misrepresentation of scientific information to the public.
- There is a strong tendency for resource agency employees to focus on their immediate



job responsibilities, versus ethical or resource obligations or multidisciplinary ecosystem perspectives, leaving them little time to think---let alone think and act ethically or broadly (Bella 1992). An independent, multidisciplinary scientific review process can help ensure that those ethical or resource or ecosystem obligations and perspectives are considered.

- Mutually beneficial relationships (a.k.a. “iron triangles”) can develop among legislators, civil-servants, and private interest groups that hinder or bias the science that is released by civil-servants (Hughes 2014a). An independent, multidisciplinary review process can help reduce that apparent or actual bias.
- Most natural resource commission and board appointees are typically oriented towards exploitation, rather than conservation, of natural resources. An independent, multidisciplinary scientific review process can help ensure that other perspectives are considered.
- Resource scientists, managers, and analysts are often encouraged to avoid explicitly conveying unpleasant facts or trade-offs to the public, senior bureaucrats, or elected officials (Lackey 2013). An independent, multidisciplinary review process can help expose those unpleasant facts or trade-offs.

## Policy

- Resource agency recommendations are usually based on both science and policy. An independent, multidisciplinary review process can help reveal those based on policy versus those based on science, both to avoid confusing the public and to better separate political decisions from scientific decisions.
- Increasingly, resource scientists are taught that science should be policy neutral, with no preference for any particular ecological condition (Lackey 2007), despite having an ethical responsibility to protect those resources (Karr 2006). An independent, multidisciplinary scientific review process can help ensure that those resources are protected.
- Resource agencies often attempt to separate natural and social sciences, humans and nature, and values and science thereby leading to narrowed knowledge and reduced ecological condition (Cairns 2011). An independent, multidisciplinary scientific review process can help ensure that those various disciplines are represented.
- Most major resource management issues combine ethics, policy, and science--making them ethical and value based choices (Wilson 1998; Holsman 2001). An independent, multidisciplinary scientific review process can help ensure that those various aspects of human knowledge are represented.
- Adaptive management is needed to solve complex environmental problems. An independent scientific review panel is an important component of an adaptive management strategy at the state level.
- Science-based approaches including scientific review can be used to facilitate negotiations among stakeholders regarding policy decisions that involve environmental conflict (Ozawa 1996). An independent scientific review panel provides an important feedback mechanism between the practice and discoveries of science, and the policy negotiations and decisions that rely on an understanding of that

evolving science.

- Sensitivity analysis or equivalence tests (McGarvey 2007) can be used to assign the burden of proof and who pays for assessing it. The general hypothesis to be continuously examined is that anthropogenic change will have an impact on ecosystems, and often that impact results in a degradation of the integrity of those systems. We generally hypothesize that people damage ecosystems and if that is proven true under examination, then the burden of proof and its attendant costs are the responsibilities of the initiator and supporters of the anthropological change (whether purposefully implemented or unintentionally caused). This is usually the opposite of what we do now with our permits, projects, regulations, and laws—producing chronic destruction as a result of thousands of small changes or acute destruction as a result of major “job-creation” projects. An independent scientific review panel provides a mechanism for ensuring accountability for both intentional and unintentional human actions.

## PROS & CONS OF EXISTING MODELS

During the workshop, participants were separated into two working groups. Each working group compared and contrasted five currently operating models of scientific review panels focused on natural resources (Table 1). Variables evaluated included appointing authorities, committee structure and selection criteria, funding sources, mean number of reports produced per year, level of committee and staff financial support, and peer review requirement.

**Table 1.** Scientific review panels compared during the workshop.

Independent Multidisciplinary Science Team (IMST)	<a href="http://www.fsl.orst.edu/imst/">http://www.fsl.orst.edu/imst/</a>
Independent Scientific Advisory Board (ISAB)	<a href="https://www.nwcouncil.org/fw/isab/">https://www.nwcouncil.org/fw/isab/</a>
Institute for Natural Resources (INR)	<a href="http://oregonstate.edu/inr/">http://oregonstate.edu/inr/</a>
Washington State Academy of Sciences (WSAS)	<a href="http://www.washacad.org/about/">http://www.washacad.org/about/</a>
National Academies of Sciences (NAS)	<a href="http://www.nationalacademies.org/studyprocess/">http://www.nationalacademies.org/studyprocess/</a>

Appointing authorities.— Only the IMST has a purely political process (unanimous agreement for appointing a panel member by the Governor, Senate President, and House Speaker) without a clear system for scientific screening. This appointment process was deemed particularly inefficient and has been prone to selecting panelists representing interest groups versus scientific and writing expertise, as well as leaving multiple panelist seats vacant. ISAB panelists are appointed by the Chair of the Northwest Power Planning Council, the National Marine Fisheries Service Regional Administrator, the Northwest Fisheries Science Center Director, and a Tribal representative. INR panelists are approved by the Oregon State University Research Vice-President, University Deans, and Oregon University System and other representatives. The WSAS and NAS panelists are selected by elected WSAS officers and directors or elected NAS officers and councilors, respectively—a less political process than the others.

Committee selection criteria & structure.— The ISAB, WSAS, and NAS panelists are selected via a self-nominating process, followed by screening for scientific expertise by the NAS, WSAS, or the National Research Council. NAS and ISAB members are asked to describe their scientific biases so that the biases can be represented or acknowledged in the panels. INR panelists are suggested by staff and other university employees and screened by the appointing authorities. IMST panelists are often self-nominated and screened by the appointing authorities, but IMST panelists have also been selected in an open job application process overseen by the GNRO. In all cases, candidates produce a resume or curriculum vita summarizing their scientific expertise and experience. INR, WSAS, and NAS scientists serve only for the time that it takes to complete a specific project, report, or review and the numbers of panelists vary with the size and complexity of the projects. Up to seven IMST and ten ISAB members are appointed for four and three year terms, respectively; additionally, ad hoc or outside experts have been invited to serve temporarily in cases where the appointed members lacked the necessary scientific expertise.

Funding sources.— The INR, WSAS, and NAS reports and activities are supported by sponsors of specific products, but all five panels have base level funding for staff. Only the IMST and ISAB fund projects independently of the funding source. The INR and NAS work to achieve project (report) independence from the sponsoring entity by negotiating the final report objectives with the sponsor and independently selecting the panel members that will work on the report.

Average number of reports produced per year.— Mean annual report production varied from one (WSAS) to forty (NAS), with the number varying with funding levels, number of panels funded, panel size, panel & staff writing skills, and type of report. For example, IMST and ISAB products have ranged from brief summary reviews to books published by external presses (e.g., Williams 2006; Yeakley et al. 2014). The WSAS model seems to be particularly unproductive, presumably because of insufficient funding by, or demand from, project sponsors, although this might result in part from its recent formation (2008).

Level of committee & staff financial support.— All five panels had sufficient base funding for one or more support staff, with the number of staff depending on the base funding level of the panel. Only IMST, ISAB, and INR paid their panel members for the amount of time spent on projects and report writing; WSAS and NAS only paid travel expenses.

Peer review requirement.— Only the WSAS and the NAS required rigorous (blind, anonymous, independent) peer review of reports; however both the IMST and ISAB sought extensive outside peer review on independently produced reports that involved considerable scientific syntheses and interpretation. Likewise, when IMST and ISAB produced reports for publication in scientific journals those manuscripts received the typical rigorous peer review of the journal (e.g., Hughes et al. 2014). Normally, the IMST and ISAB reviews of agency plans, proposed projects, and programs did not receive outside peer review, unless a subject matter expert was lacking from the panel.

## **WORKSHOP FINDINGS AND INSIGHTS**

Comments on SB202.— Serious concern was expressed regarding how to appoint the task force charged with implementing SB202 ( see Appendix 2 for the bill’s summary). Such a task force should have representation beyond academia, and include nongovernmental organizations, tribes, and federal and state agencies and include scientists and non-scientists to ensure that the implementation process does not appear to be narrowly construed or simply a cash cow for universities. These task force members should be selected in a process resembling that proposed for selecting members of the independent multidisciplinary science panel versus a potentially politicized and inefficient university-focused manner (see Recommendations to task force below).

There was also concern about the breadth of an unfocused natural resources scientific review panel; too broad a panel may be overly costly, cumbersome, and complex, and it might be challenging to prioritize projects for review. Establishing a defined scope for the independent multidisciplinary science panel seemed necessary, such as the goal of conserving and rehabilitating healthy and sustainable riverscapes, landscapes, and oceanscapes. On the other hand, the focus of the panel should not be restricted to state agencies. County and city governing entities may benefit from scientific review even more than state agencies in cases where they share common problems but lack the scientific expertise and/or base funding to develop science-based implementation and policy.

Another shortcoming of the bill, as well as of the current IMST review process, is the demise of the Natural Resources Core Team. There are inherent conflicts within and among state agencies regarding resource management; there is a tendency for compartmentalizing management issues, versus viewing human, resource, and watershed management as a complex interacting whole. In particular, adaptive management and standard methods of monitoring, data management, and public reporting of key ecological indicators are needed. Therefore, it was recommended that the Core Team be re-constituted and re-charged with at least 0.5 FTE dedicated for funding a Core Team Coordinator or Chair. In addition, to elevate natural resources science at the state level further, it would be wise to make a science panel co-chair a Cabinet member.

The bill also focuses on responding only to requests for scientific review of existing plans or projects from state institutions. Because of heavy workloads that leave little time for introspective thinking (see benefits of scientific review section above), agencies frequently do not ask the critically important questions. Therefore, workshop participants felt that an independent multidisciplinary science panel should be encouraged occasionally to develop entirely independent, broadly conceived reports originating from the panel itself as the need becomes apparent.

Additionally, it was observed that the Oregon Academy of Science already exists as an affiliate of the American Association for the Advancement of Science. Its sections are based on basic sciences (biology, chemistry, geology, health, math, physics, social and health sciences) versus

applied sciences (fisheries, forestry, wildlife, agriculture). It may not be the best model or avenue for a science review panel.

Workshop informal recommendations to task force.— Following the IMST and ISAB models and to retain a level of institutional memory, the workshop participants felt that an independent multidisciplinary science panel should consist of seven to ten scientists, appointed for three to four year terms, and representing key scientific disciplines that involve natural resource science and management. Following the ISAB, WSAS, and NAS models, those scientists would be self-nominated (following a call for nominations from appropriate scientific societies) but reviewed or screened by those scientific societies, the NAS, or NRC. A set of twenty or so nominees would then be presented to the appointing political authorities. A major problem with IMST has been the failure to appoint a sufficient number of, and sufficiently qualified, panelists in a timely manner. Nonetheless, it was deemed important to have high-level political support and funding for a state science review panel. Therefore, workshop participants felt that it would be useful to retain appointing authority with the Governor and Legislative Assembly. However, it was recommended to have a time limit of thirty to sixty days for the appointments to be made following delivery of the files of the twenty finalists to the appointing authorities. Ideally the Governor and the Legislative Assembly or their designees would jointly make the appointments. If both could not act within that time period, then the default would be the Governor's appointments. If the Governor could not make the appointments within that time period, the default would be the Legislative Assembly. If neither acted within the thirty to sixty days, the default would revert to the existing independent multidisciplinary science panel to appoint new panelists.

In addition to paid core science review panelists, it was deemed useful for the team to have the flexibility of appointing ad hoc, temporary panelists when the particular scientific needs were outside the expertise of the core panelists. Those ad hoc panelists would be selected based on the core panelists' knowledge of their expertise and availability.

The science review panel is expected to be reviewing a wide range of state natural resource agencies and natural resource issues, as well as difficulties in implementing the best available science in resource management by those agencies and local governments. Therefore, it is advisable to have such disciplines as agriculture, air quality, aquatic ecology, climatology, fisheries, forestry, hydrology, marine resource management, population ecology, range management, toxicology, water quality, and wildlife management, represented, as well as ecological economics, environmental law, environmental planning, natural resource economics, public policy, and sociology. The latter disciplines may be especially useful in helping resolve implementation barriers and in incorporating the social drivers of human impacts on natural systems. Panelists should not be limited to Oregon residents; however, to limit travel expenses and communication limitations they may be expected to be Pacific Northwest residents in most cases. In addition, it should be recognized that scientists are humans and have differing values and perspectives; therefore, the panel should represent a wide array of perspectives and values (as do NAS panels) and these should not be viewed as conflicts of interest. Conflicts of interest should be restricted to direct or indirect sources of financial gain, assessed by the panel at the time a project or review is initiated.

Because there is a continuum of scales from ground-level project permits to state-level policies, it is important to indicate how scientific review informs and adds value to both levels and whether the panel will focus on both these scales or primarily only one.

It was recommended that the science panel itself develop its own written guidelines regarding how requests for reviews are posed, refocused by the panel if necessary, prioritized, and rejected. Likewise, the panel should determine which reports and reviews should receive outside peer review and how those reviews should be conducted (i.e., blind versus open).

An independent multidisciplinary science panel must be accessible to private citizens and nongovernmental organizations, to overcome the limitations of “ivory tower science” and to reduce an impression of regulatory oppression. Therefore review requests should be welcomed from both governmental and non-governmental entities. The reviews and reports should be written in clear English to facilitate making key results of the products understandable by the public, and those results should be disseminated widely via various media. It would be useful for the panel to have a public outreach specialist to aid in this process.

The panel should receive a base level of funding from the state, and if the staff is housed at a university, the infrastructure costs can be lowered via low indirect cost rates. The cost burden of the panel, however, should be born primarily by state resources, not the universities. It is unreasonable to expect panelists to work many hours on projects or reviews for free or for the universities to support the panelists’ hours or salaries. If individual agencies pay for individual reviews, it creates the appearance that they are paying for a specific outcome (an apparent conflict of interest). Such payments, as opposed to need, would also govern what gets reviewed; even the NAS experiences considerable politics versus science in this process. In addition, regardless of where the staff is housed, it is important to have panelists from other institutions to avoid the impression that the panel is a university think tank. This was the impression of some regarding INR and WSAS.

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Yeakley, J.A., K.G. Maas-Hebner, and R.M. Hughes (editors). 2014. Wild salmonids in the urbanizing Pacific Northwest. Springer, New York, New York.

## ***Appendix 1. Workshop participants and their affiliations***

Allison Aldous	The Nature Conservancy
Lauri Aunan	Governor's Natural Resource Office
Noel Bacheller	Oregon Parks and Recreation Department
Bill Braunworth	Oregon State University
Gene Foster	Oregon Department of Environmental Quality
Lisa Gaines	Institute for Natural Resources
Bob Hughes	Independent Multidisciplinary Science Team
Ray Jaindl	Oregon Department of Agriculture
Dave Jepsen	Oregon Department of Fish and Wildlife
Hiram Li	United States Geological Survey, retired
Jim Lichatowich	Alder Fork Consulting
Kaitlin Lovell	City of Portland
Gordon Levitt	Governor's Natural Resource Office
Jim Myron	Native Fish Society
Bill Ryan	Oregon Department of State Lands
Carl Schreck	Independent Multidisciplinary Science Team
Howard Schaller	U.S. Fish and Wildlife Service
Greg Sieglitz	Oregon Watershed Enhancement Board
Jonathan Soll	Portland Metro
Ken Starh	Oregon Water Resources Department
Alan Yeakley	Independent Multidisciplinary Science Team
Andrew Yost	Oregon Department of Forestry

## ***Appendix 2. Summary of SB202***

As submitted to the upcoming (Feb 2015) Oregon legislative session, the text of the summary of SB202 follows:

### **SUMMARY**

Requires establishment of Oregon Academy of Sciences as nonprofit corporation to serve as principal source of scientific investigation, examination and reporting on scientific questions referred to academy by Governor, Governor's designee or Legislative Assembly. Requires certain provisions in academy articles of incorporation and bylaws. Establishes Oregon Academy of Sciences Organizing Task Force. Requires task force to investigate and develop organizational structure of Oregon Academy of Sciences. Requires task force to file articles of incorporation for academy by January 1, 2017. Requires task force to report to legislature. Appropriates moneys to University of Oregon for purposes of carrying out duties of task force. Sunsets task force on January 2, 2019. Abolishes Independent Multidisciplinary Science Team on January 1, 2017. Declares emergency, effective on passage.

