



empowering the lasting conservation of fish and wildlife and citizen enjoyment of our natural resources

Grant Application Cover Sheet

Please complete the following coversheet. See the grant application guidelines on our website www.myowf.org/grants to complete your application. Volunteer organizations without nonprofit status must have a tax-exempt fiscal sponsor. You may scan and email this cover sheet and your application.

About You

- 1 Project Title: Pilot Targeted Oregon Kelp Restoration Project
- 2 Organization: Oregon Kelp Alliance, Oregon Sea Farms
- 3 volunteer organizations without nonprofit status, list your fiscal sponsor: OSU Agricultural Research Foundation
- 4 Tax id number (not required for governmental applicants):
- 5 Project Manager Name: Tom Calvanese Title: Station Manager, OSU Port Orford Field Station/Coordinator, Oregon Kelp Alliance
- 6 City: Port Orford Address: PO Box 490 Zip Code: 97465
- 7 Phone (office): (541)-366-2500 Phone (mobile): (415)-309-6568 email: tom.calvanese@oregonstate.edu
- 8 Tell us about yourself (brief biographical statement): Tom Calvanese is a marine biologist, and former commercial urchin diver living and working in Port Orford since 2011. Tom works for Oregon State University as the Station Manager for the Port Orford Field Station, part of the OSU Marine Studies Initiative. He is also the Coordinator for the Oregon Kelp Alliance. He serves as a Port Commissioner for the Port of Port Orford, is a member of the Rocky Habitat Working Group currently revising Oregon's Territorial Sea Plan, and is on the Steering Committee for the Redfish Rocks Community Team.
- 9 Have you applied for a grant from Oregon Wildlife Foundation before? Yes No
- 10 If "yes", what was the name of the project?

About Your Proposed Project

- 11 What type of project are you proposing? Fish Wildlife Other
- 12 Will it address an Oregon Conservation Strategy habitat or species? Yes No
If "yes", please name the habitat and/or species addressed: Species: Bull kelp (*Nereocystis luetkeana*); Red Sea Urchin (*Mesocentrotus franciscanus*); purple sea urchin (*Strongylocentrotus purpuratus*); Red Abalone (*Haliotis rufescens*); black rockfish (*Sebastes melanops*), blue rockfish (*Sebastes mystinus*); brown rockfish (*Sebastes auriculatus*); cabezon (*Scorpaenichthys marmoratus*); canary rockfish (*Sebastes pinniger*); China rockfish (*Sebastes nebulosus*); copper rockfish (*Sebastes caurinus*); deacon rockfish (*Sebastes diaconus*); grass rockfish (*Sebastes rastrelliger*); kelp greenling (*Hexagrammos decagrammus*); lingcod (*Ophiodon elongatus*); pile perch (*Rhacochilus vacca*); quillback rockfish (*Sebastes maliger*); rock greenling (*Hexagrammos lagocephalus*); topsmelt (*Atherinops affinis*); vermilion rockfish (*Sebastes miniatus*); yelloweye rockfish (*Sebastes ruberrimus*), yellowtail rockfish (*Sebastes flavidus*)
- 13 Proposed start date: Summer 2020 Anticipated end date: indefinite
- 14 Project Location (attach map): Nellie's Cove and nearby rocky reefs Nearest town or city: Port Orford County: Curry
- 15 Has a local, state, or federal biologist reviewed this project? Yes No
If "yes", what is their name? Phone: ()-- email:
- 16 If "no", what is your plan for an external review of the project? Scott Groth

Exploring Targeted Bull Kelp Restoration in Southern Oregon

Introduction

[The Oregon Kelp Alliance \(ORKA\)](#) represents diverse interests in kelp forest ecosystems, and includes commercial urchin divers, researchers, managers, conservationists, tour guides, sport divers, chefs, and other community members in support of healthy kelp forests.

The proposed grant request seeks support for a pilot targeted bull kelp restoration project using sea urchin removal and cultivation to explore the viability of this ecosystem /economic incentive approach to kelp restoration in areas experiencing loss of kelp forest habitat along the southern Oregon coast.

Kelp forest habitats are essential to other conservation strategies, such as those aimed at sustainable fisheries, nearshore biodiversity, or the potential long-term strategy to reintroduce sea otters to Oregon.

Background & Need

The Oregon nearshore marine habitats are renowned for their significant diversity and productivity of marine life. The Oregon Conservation Strategy and Nearshore Strategy combined list of nearshore Strategy Species include 40 fish species, 14 invertebrates, 6 marine mammals, and 4 plant/algae species. Of those approximately 20 fish species, 7 invertebrates, and 3 marine mammals depend on bull kelp habitat during one or more of their key life history stages. Thus, 30 of the 65 Strategy Species in the Oregon's nearshore ecosystem depend on kelp (46%) and bull kelp is itself a Strategy Species. No other single nearshore marine habitat in Oregon is as ecologically and economically important as kelp habitat. Of notable mention are approximately 15 species of rockfish listed as Strategy Species that collectively represent a large percentage of Oregon's commercial and recreational fisheries.

Moreover, kelp habitat is the primary refugia and feeding habitat for sea otters. The Elakha Alliance is launching a multi-year plan to assess, design and implement the thoughtful reintroduction of sea otters to carefully identified locales on Oregon's south and central coasts.

¹ Oregon Conservation Strategy. (2016). Oregon Department of Fish and Wildlife. *Salem, Oregon*.

² Don, C., Fox, D., Merems, A., Sommer, M., Weeks, H., & Wiedoff, B. (2006). The Oregon nearshore strategy. *Oregon Department of Fish and Wildlife*.

Around the globe and in Oregon, a growing body of evidence suggests climate change and its ecological consequences are threatening the long-term persistence of kelp¹. In certain areas like Oregon's south coast, the disappearance of important bull kelp populations is drawing attention from the scientific community, natural resource managers, commercial divers and fishermen, sport divers, ecotourists and the businesses who serve them, and coastal communities.

More recently, studies have revealed the rapid climate-driven catastrophic shift in 2014; from a previously robust kelp forest to unproductive large-scale urchin barrens in northern California, an ecoregion bearing many similarities to that found on the southernmost coast of Oregon². Most recently, the Oregon Department of Fish and Wildlife, in collaboration with commercial urchin divers, completed a survey of sea urchin populations at Orford Reef, reporting a preliminary estimate of ~350 million purple sea urchins, a more than 10,000-fold increase on this single reef since 2014³. These and other trends have occurred in concert with the alarming collapse of the sunflower sea star (*Pycnopodia helianthoides*), across its Pacific range – due to the mysterious “sea star wasting disease”⁴. Likely to soon be "Red Listed" by the IUCN, this large predatory sea star is also a Strategy Species, and a primary predator of sea urchins.

Port Orford, Oregon's sea urchin divers began to bring attention to the emerging urchin population boom and bull kelp disappearance in 2014 and have worked with ODFW shellfish biologists to monitor and survey urchin populations for years prior to these more recent events. More recently, the emergence of a local ecotour business, and the establishment of a local field station, operated by Oregon State University and used by many researchers from University of Oregon's Oregon Institute of Marine Biology (OIMB), OSU, ODFW, NOAA, and others), has led to an increase in investigation of kelp forest ecology and health.

¹ Kira A. Krumhansla, et al, PNAS | November 29, 2016 | vol. 113 | no. 48 | 13785–13790

² L. Rogers-Bennett* & C. A. Catton, Nature - Scientific Reports | (2019) 9:15050

³ Filbee-Dexter, K., & Scheibling, R. E. (2014). Sea urchin barrens as alternative stable states of collapsed kelp ecosystems. *Marine ecology progress series*, 495, 1-25.

⁴ Stack, J. S., & Menge, B. A. (2019, May). –Responses of a keystone species to catastrophic population crash: interactions across life-history stages drive population and community dynamics. In *AN ABSTRACT OF THE DISSERTATION OF* (p. 49).

Project Outline

This proposal seeks to secure resources to add support to an existing targeted bull kelp restoration plan underway by a diverse group of scientists and stakeholders. The Oregon Kelp Alliance (ORKA), a grassroots group that has emerged in response to the increasing awareness of the loss of bull kelp in certain areas and the interest in organizing support for appropriate monitoring, and targeted restoration work involving the removal of surplus production of sea urchin, particularly purple sea urchin (*Strongylocentrotus purpuratus*).

Members of the Oregon Kelp Alliance (ORKA), include:

- Oregon Sea Farms - commercial urchin divers, dulse farm operators, urchin ranch operations.
- Oregon Department of Fish and Wildlife, Shellfish Program
- University of Oregon - Oregon Institute of Marine Biology
- Oregon State University - Port Orford Field Station, Marine Studies Initiative
- Geospatial Ecology of Marine Megafauna (GEMM) Lab (OSU)
- The Nature Conservancy -Oregon Office
- South Coast Tours - kayak and dive tours on Oregon's south coast
- Oregon Department of Land, Conservation, and Development (DLCD)
- Ocean Acidification and Hypoxia Coordinating Council
- Port of Port Orford - Seafood Hub redevelopment project to include redevelopment of seawater pump ashore system to support mariculture operations

The disappearance of sea otters from Oregon, occurring approximately 100 years ago, laying the groundwork for the current "perfect storm" of conditions conducive to the changes now being seen on Oregon's coast: an increase in ocean temperature, a massive die-off of sea stars due to wasting disease, and a huge recruitment of sea urchins. These conditions have contributed to the emergence of urchin barrens, characterized by unusually high densities of urchins, in place of healthy kelp forests. These urchin barrens may become a near-irreversible "stable state" even in the presence of predators like sea stars and otters.

Once kelp has been entirely removed by high densities of sea urchins, long-lived urchins persist in a starvation state, prohibiting new kelp from establishing, but not eating enough to provide caloric value to sea otters. As a result, otters may not utilize them as prey. Likewise, starved urchins from "barrens" also hold no value to commercial urchin divers, since they do not produce edible uni, or roe.

Oregon Kelp Alliance partners responded to this challenge with an innovative market-based solution to harvest purple sea urchins within "barrens" and feed them in an aquaculture setting until they are able to produce a commercially viable product sold as "uni".

Urchin Removals & the Mariculture Pilot Program

We are seeking to fund the continual removal of purple sea urchins on identified kelp habitat areas within the Nellie's Cove region in Port Orford by professional urchin divers and other SCUBA divers associated with ORKA. Funds would help pay for diver time and boat operation for season 1. Urchin removals are the first component of the planned mariculture pilot project to "ranch" purple sea urchins by feeding them cultured dulse from Oregon Sea Farms successful dulse culture operation at the Port of Port Orford. Similar projects around the world have demonstrated the viability of this approach, and early explorations in Port Orford have shown promise.

Commercial urchin divers from Oregon Sea Farms have been involved in the initial formation of ORKA, currently operate the dulse farm, and have proposed to expand the farm to include a pilot urchin ranching operation.

The goals of this effort are:

- 1) Remove surplus production of purple sea urchins from kelp forest habitat, which threaten the persistence of healthy standing kelp that forms the foundation of kelp forest habitat upon which many Oregon Conservation Strategy Species depend.
- 2) Support the initial emergence of a new mariculture industry that could mitigate the long-term threat of purple sea urchins to existing or new kelp areas by creating economic incentives to establishing and maintaining kelp forest "oases."

Project Outcomes

This project will provide support for a rapidly emerging grassroots response to an unfolding ecosystem disruption of unknown proportions. It is important that such efforts receive timely support when they occur in order to maintain momentum within the community, and maintain effective industry, agency, and academic connections.

Some expected potential outcomes include:

- a) Potential for localized restoration of bull kelp in target areas where kelp forests have disappeared or been drastically reduced, thereby benefiting many Strategy Species
- b) Removal of sea urchins, providing potential benefits to red abalone through release from competition for food (both red abalone and urchins feed on kelp).
- b) Maintenance of kelp forest "oases," providing spore to surrounding areas under future conditions more conducive to kelp recruitment
- c) Increased carbon sequestration resulting from kelp growth
- d) Economic benefits from successful ranching (fattening) of sea urchin uni sufficient to achieve marketable production and continued kelp conservation capacity

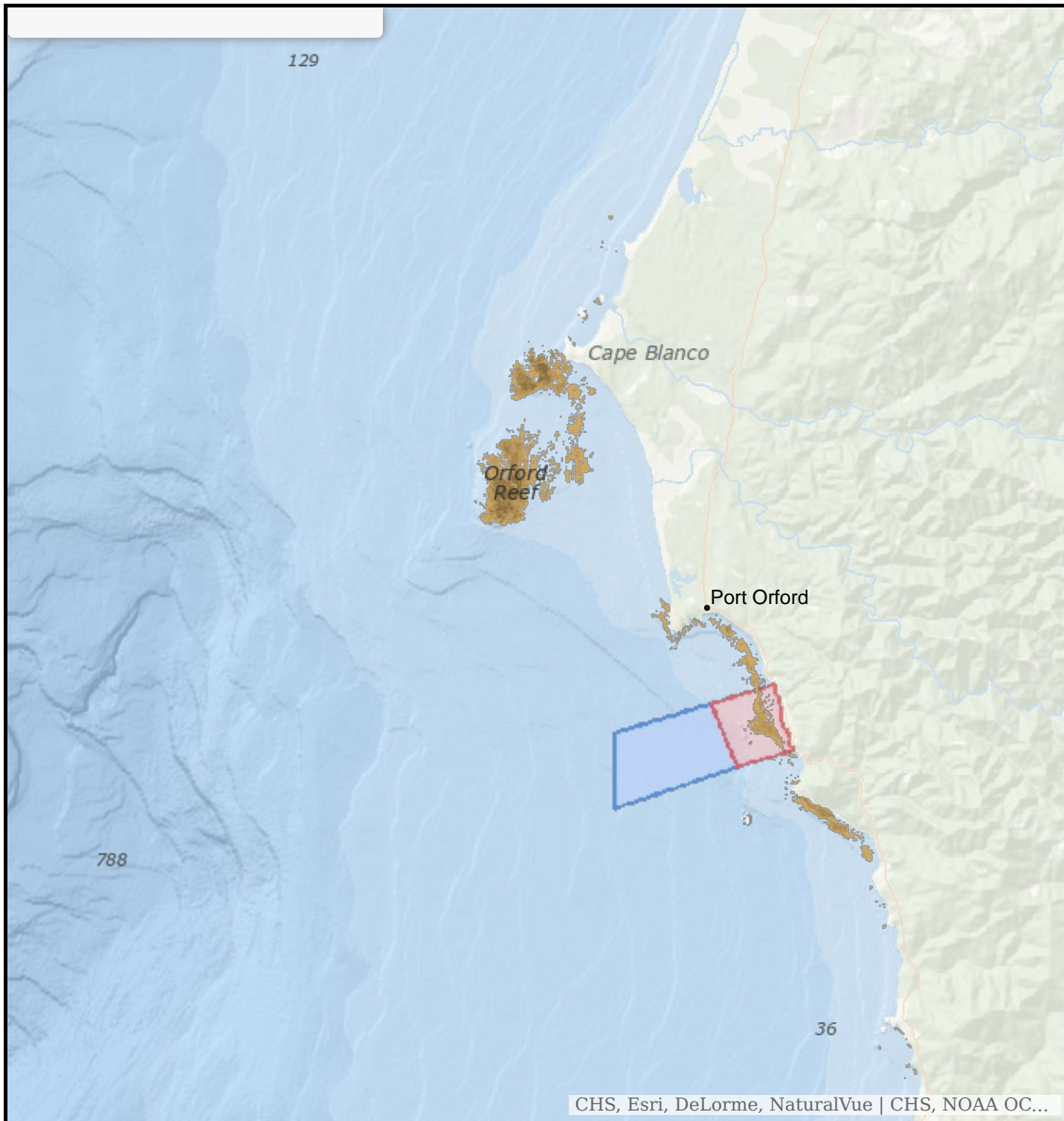
Quantifying Results & Project Management

Urchin removals, project management, and subsequent monitoring of kelp “oases” will be conducted by ORKA partners including ORKA coordinator Tom Calvanese with OSU’s Port Orford Field Station, ODFW Shellfish Biologist, Scott Groth, Oregon Sea Farms, the Elakha Alliance, and other members of ORKA.

Communication & Acknowledging the Oregon Wildlife Foundation

The Oregon Kelp Alliance, in partnership with the Oregon Coast Visitors Association, is supporting the production of a short documentary film that will help communicate the background, rationale, progress, and findings of the proposed work, serve as a recruitment tool for volunteer divers and others interested in participating in the project, and offer an ideal platform to acknowledge the Oregon Wildlife Foundation and its support for this project. OWF could also be listed as a project partner/sponsor on the ORKA website, and will receive monthly updates on the kelp restoration pilot project if supported in part by the OWF.

Thank you for this opportunity.



Modern Kelp Surveys

(ODFW 1990, 1996-1999, 2010)

- Kelp documented in 1 survey
- Kelp documented in 2 surveys
- Kelp documented in 3 surveys
- Kelp documented in 4 surveys
- Kelp documented in 5 surveys
- Kelp documented in 6 surveys

Oregon Marine Reserves and Marine Protected Areas

- Marine Protected Area
- Marine Reserve





Robert Bailey
Chairman, Board of Directors
Elakha Alliance
PO Box 704
Siletz, OR 97380

May 4, 2020

Tim Greseth
Executive Director
Oregon Wildlife Foundation
901 SE Oak St #103
Portland, OR 97214

Dear Tim,

Over the course of our strategic planning work with the Elakha Alliance, concern over the health of the kelp ecosystem in Oregon has shifted markedly within the conservation professional community; from one of many emerging priorities, to what may be the central conservation issue in the Pacific Northwest. As such, I am pleased to enthusiastically support the grant proposal submitted by Tom Calvanese, seeking funds for the work of the Oregon Kelp Alliance (ORKA) – a robust partnership between OSU, urchin divers, conservationists, policy professionals, researchers, and ODFW managers.

Recently, marine resource managers and commercial fishermen have voiced concerns over dramatic increases in “urchin barrens” replacing once vibrant kelp beds. This shift occurred in concert with a continental scale collapse of sea stars and an ocean warning trend known as “the blob”.

As you may know, about 50% of the Strategy Species occurring in Oregon’s marine environments depend on kelp habitat in one or more stages of their life history. In effect, kelp is the “Riparian” habitat of the Nearshore, and the nursery of Oregon’s substantial commercial and recreational fisheries - yet action is lagging.

In Oregon, Tom’s ORKA partnership is taking the lead, but they need partner support. I think this would be a great new conservation story for OWF to be a part of, and key to the Elakha Alliance’s chances of success. There is a plausible concern that without preemptive action, the feasibility of sea otter reintroduction may slowly deteriorate with declining kelp beds. While sea otters regenerate kelp – they still need kelp “oases” as a foundation of the founding translocated population.

Regards,

Robert Bailey