

# **Objectives**

- Restore degraded kelp forest habitat along 3 km of shoreline
- Improve habitat for northern abalone and other kelp forest species
- Work collaboratively with others to achieve shared conservation goals

# Introduction

Kelp forests benefit coastal communities and ecosystems by increasing coastal productivity and supporting ecologically sustainable use. Today, kelp forests in Gwaii Haanas are greatly diminished due to voracious grazing by hyperabundant sea urchins. Degraded kelp forests negatively impact culturally and economically important species including endangered northern abalone by reducing habitat that provides food and protective cover. We aim to restore kelp forests along ~3 km of coastal habitat in an Abalone Stewardship Area within Gwaii Haanas.

# **Study area**









# Chiixuu TII iinasdII – Nurturing Seafood to Grow

Transforming urchin barrens to kelp forests: restoring abalone and rockfish habitat in Gwaii Haanas

A collaborative project between the Council of the Haida Nation, Parks Canada Agency, Fisheries and Oceans Canada, Pacific Urchin Harvesters Association, Florida State University and the University of British Columbia

# Implementation

**Summer 2018** Pre-treatment monitoring & research

Early fall 2018 Post-treatment monitoring & research

Early fall 2018

**Restoration work:** 

75% reduction in

urchin abundance

Early fall 2017 Pre-treatment monitoring & research



## **Expected Results**



### **Short term**

- Kelp forest depth & area
- Kelp stipe density
- Habitat conditions for abalone
- Collaborative research, restoration & education

- species

• Urchin density





om: Lee, L.C., Watson, J.C., Trebilco, R., Salomon, A.K. (2016) Indirect effects and prey behavior mediate interactions between an endangered prey and recovering predator. Ecosphere 7. Poster photo credits: Lynn Lee, Nadine Wilson, Pacific Urchins Harvesters Association

# Lynn Lee, Robyn Irvine, Nadine Wilson\* I Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site



Summer 2019-2020 Post-treatment monitoring & research

Spring 2019-2021 Ongoing urchin control (with possible extension)



## Long term

 Biodiversity & primary productivity • Habitat for abalone & other kelp forest species • Shoreline protection from coastal erosion Larval retention & recruitment for kelp forest

• Nutrient input into coastal ecosystems • Carbon fixation through kelp growth Collaborations to maintain conservation gains

### **Post-treatment**



# **Research Focus**

## How can kelp forest restoration benefit abalone and local biodiversity?

Abalone benefit from increased kelp forest habitat through increased habitat protection and food provision. We intend to investigate the underlying mechanisms which remain largely unknown:

# What are the ecological effects of crushing urchins in the barrens?

To help evaluate potential effects of similar kelp restoration projects in future, we will investigate the short and potentially long-term effects of in situ urchin crushing on local ecological processes:

- where does it move?
- ecosystem?

# **Public Outreach & Support**

Public awareness to build support for Gwaii Haanas' marine conservation and restoration work:



• What are current abalone and urchin growth rates and demographics?

• How will these characteristics respond to expected habitat changes with significant reductions in urchin density?

• How will abalone and urchin diets change following urchin reduction?

• Will abalone behaviour change from being more out in the open to more cryptic in crevices following sea urchin reduction?

• How will local biodiversity and species composition change with expected kelp forest recovery?

• What volume of dead urchin biomass enters the water column and

• How does the crushed urchin biomass get processed in the

• How long does it take for the short-term ecological effects of this pulse input of dead biomass to return to 'normal' levels?

Does the expected short-term increase in predatory fish and invertebrates have an obvious negative effect on abalone at the site?

• Media outreach to inform the public about kelp forest restoration

• **Public presentations** by project team members about our project

• Facilitating **opportunities for visitors** to Gwaii Haanas to experience and understand kelp forests and the connections between marine ecology and Haida culture.





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