

Deepwater Sidescan Sonar and Camera Surveys for Derelict Fishing Nets and Rockfish Habitat

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NORTHWEST STRAITS
marine conservation initiative



Purpose

- Study to test feasibility of derelict net detection using sidescan sonar
- Verification of sidescan targets with drop camera
- Assessing potential threat of derelict nets to rockfish in water 105 – 350 ft deep
- Collect information to develop deepwater derelict net removal plan

Introduction

- Since ESA listing of yelloweye, bocaccio and canary rockfish: Increasing interest from resource managers in understanding extent of impacts of derelict nets on rockfish populations in Salish Sea
 - Some impacts have been documented (Drinkwin presentation)
- NWSI removals since 2002 have focused on water <105 feet deep due to diver safety regulations
 - The three ESA listed species commonly reside in >105 ft water depths.

Introduction

- Sidescan sonar has proven effective in locating derelict nets (and pots) in shallow water
- Diver and camera surveys are effective in characterizing size and condition of nets, but limited in area covered
- This project combined the two survey methods

Methods: Sidescan Sonar

- Two days of sidescan surveys (one-half day of data post-processing) on southeast Lopez Island and west San Juan Island from Small Pox Bay to Salmon Bank
 - Marine Sonics[®] 300 kHz transducer
 - Stainless steel heavy towfish
 - Trimble[®] differential GPS
 - Clutched hydraulic winch with heavy cable
 - Inertial motion tracking system
 - Ultra-short baseline (USBL) acoustic tracking system
 - Central Processing Unit (CPU)
 - Hypack[®] hydrographic survey software

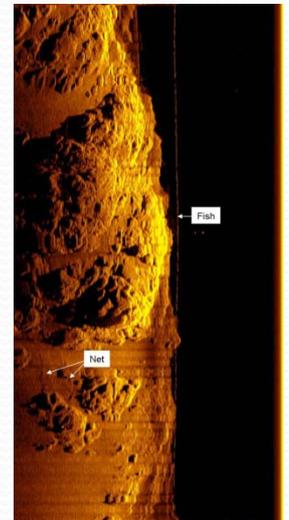
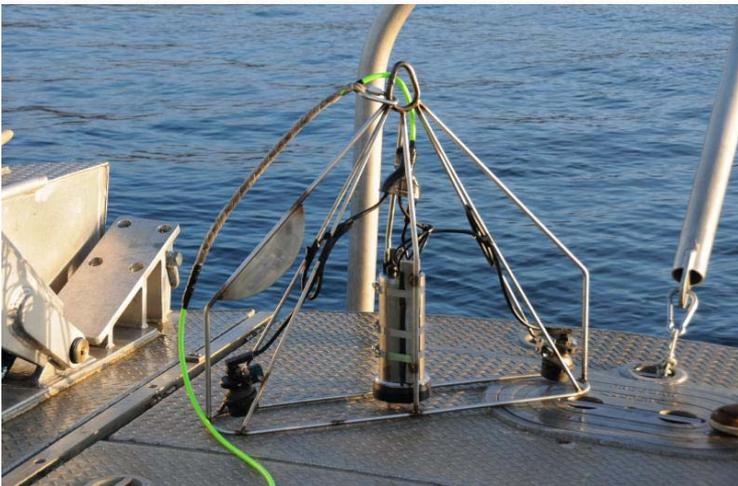
Methods: Drop Camera

- Six days of drop-camera surveys
 - Canon® Vixia HFS11 in 1920x1080 HD
 - Deep Sea Power & Light® Mini C Series lights
 - Custom titanium housing with wide-angle lens
 - Video control via RS485 connection to topside laptop
 - 1000-foot long Falmat Xtreme-Cat® ruggedized umbilical
 - Trimble® differential GPS
 - GeoStamp+® for lat/long coordinates overlaid on analog video output
 - Nobeltec® navigation software for trackline recording

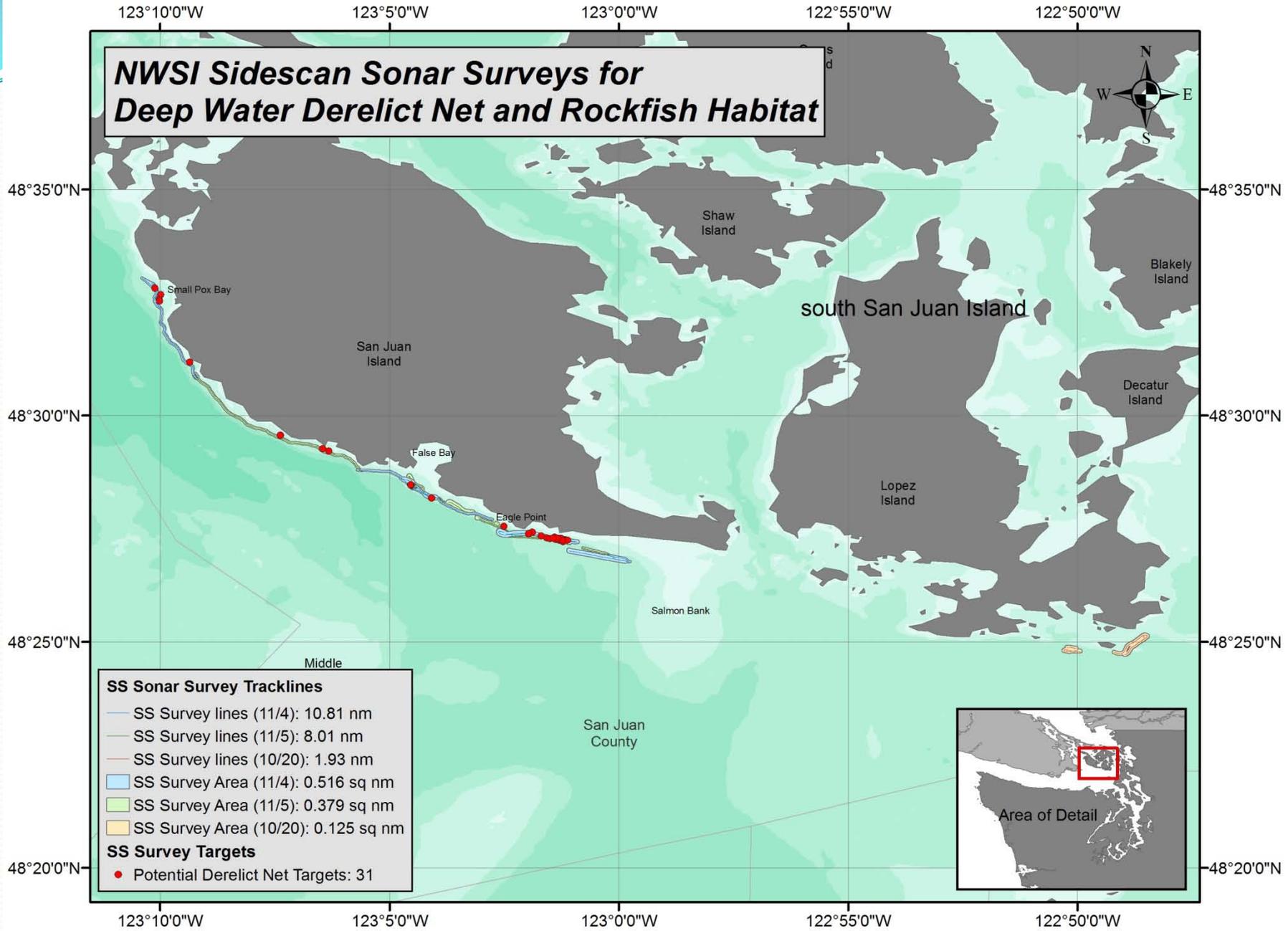
Results

- 31 probable derelict net targets identified along survey length of 20.75 nautical miles
- 13 net targets investigated during six days of drop-camera surveys
 - 9 sidescan sonar targets
 - 4 previously reported targets
- 11 targets identified as net or line, 2 not found
- 9 of 9 sidescan targets proved to be net, leadline or purse-seine rope

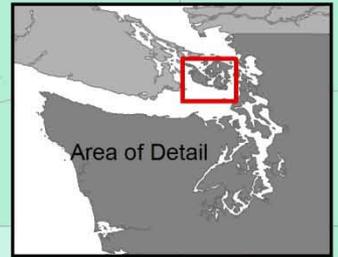
Equipment



NWSI Sidescan Sonar Surveys for Deep Water Derelict Net and Rockfish Habitat



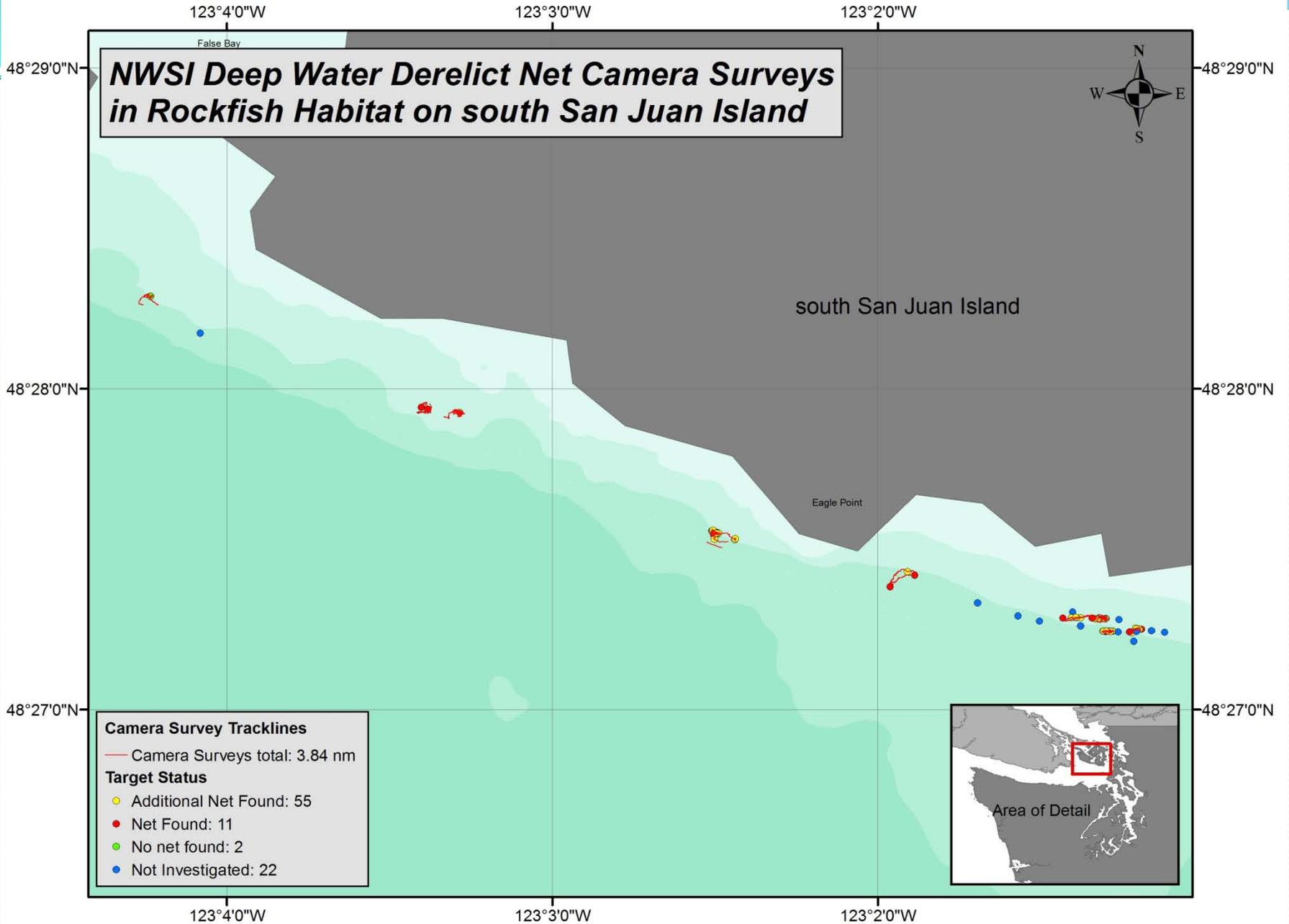
SS Sonar Survey Tracklines	
— SS Survey lines (11/4): 10.81 nm	
— SS Survey lines (11/5): 8.01 nm	
— SS Survey lines (10/20): 1.93 nm	
■ SS Survey Area (11/4): 0.516 sq nm	
■ SS Survey Area (11/5): 0.379 sq nm	
■ SS Survey Area (10/20): 0.125 sq nm	
SS Survey Targets	
● Potential Derelict Net Targets: 31	



Results

- Extensive amount of rockfish habitat identified during drop-camera surveys
 - Steep rock structures w/ valleys and caverns
- Additional 55 net targets identified with drop-camera, not identified with sidescan sonar
 - At one location, net tubed and wrapped around rock pinnacle, then stretched across flat area at base of structure
 - Most nets ensnared on ridges and draped through valleys, sometimes suspended
 - Many fish (rockfish, greenling, lingcod) observed near net locations

NWSI Deep Water Derelict Net Camera Surveys in Rockfish Habitat on south San Juan Island



Discussion

- Proved feasibility of locating derelict nets in deepwater with sidescan sonar and ground truthing images, habitat and associated marine fauna with drop-camera.
- Additional net targets identified with drop-camera indicates difficulty in locating derelict nets with sidescan sonar in areas of steep, hard bottom substrate.
 - Near vertical substrate reflected nearly all acoustic energy, masking derelict net characteristics in image
 - Cracks and crevices in vertical rock walls appear similar to derelict net or lines in sidescan images
 - ROV video surveys may be more appropriate for hard bottom areas

Discussion

- ROV surveys rather than drop-camera could increase productivity in ground-truthing derelict gear targets
 - much more area covered
 - Better control of video coverage (piloted topside)
- Sufficient information collected on length, width and configuration of derelict nets in rockfish habitat was gained
- Next Step: develop protocol for deepwater net removal (beyond scope of this project)