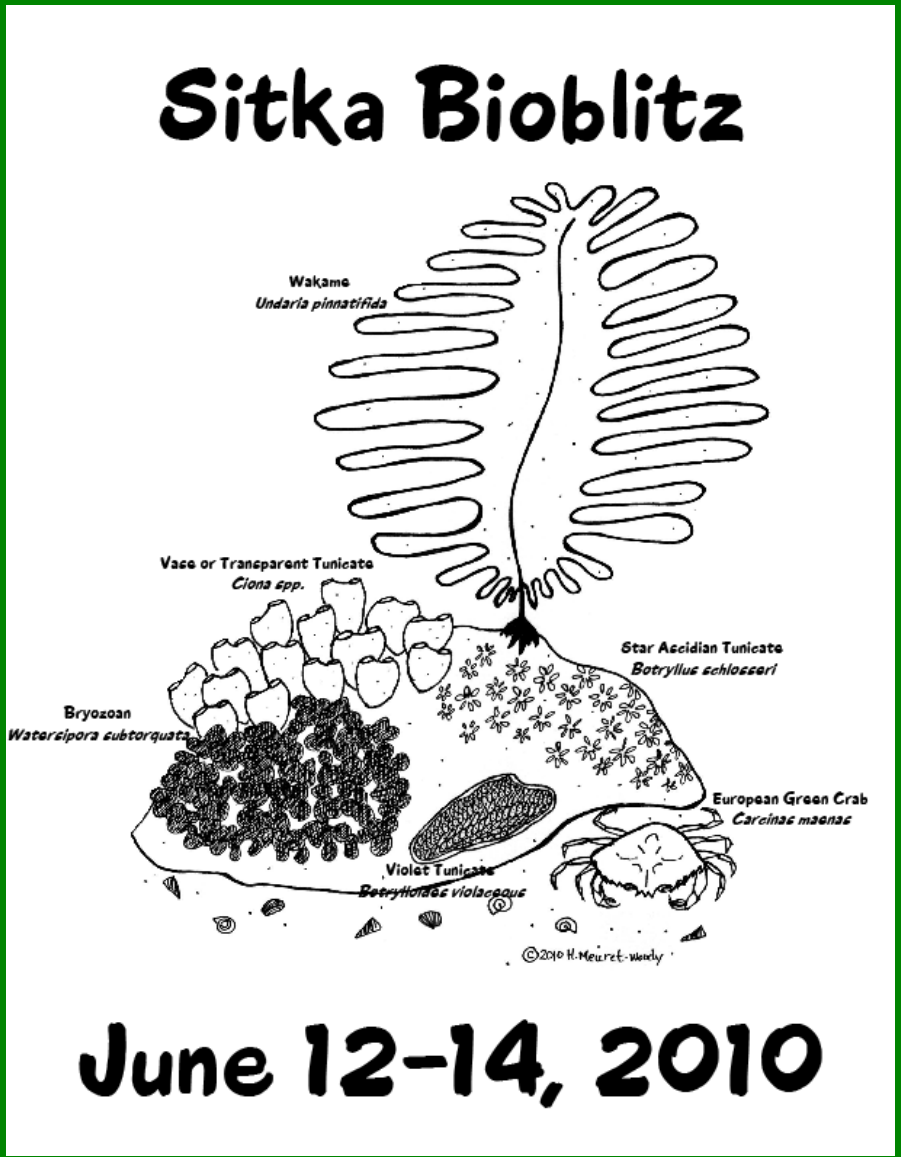
Sitka Marine Invasive Species Bioblitz Held June 12-14, 2010



Presenter:

Linda Shaw, National Marine Fisheries Service

Sponsors:

Sarah Cohen, Romburg Tiburon Center, San Francisco University

**Tammy Davis, Alaska Department of Fish and Game*

Linda McCann, Smithsonian Environmental Research Center

Heather Mueret-Woody, Sitka Tribe

John Stein, & Marnie Chapman-Sitka Sound Science Center

Marine Subcommittee of the Alaska Invasive Species Working Group

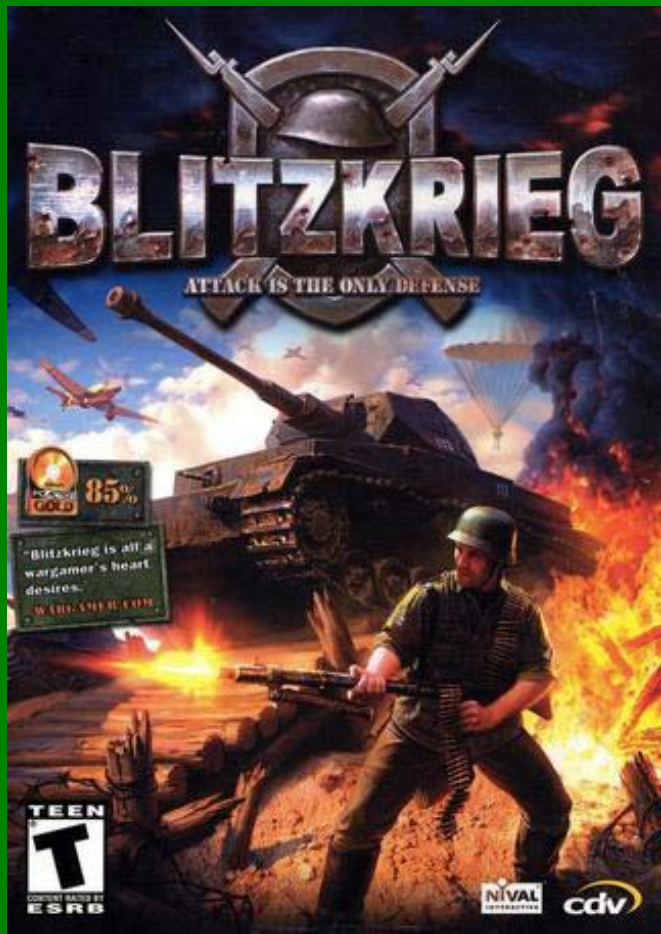
**Including Funding*

WHAT IS A BIOBLTIZ?

From the Greek “bio”, meaning “life”
and
From the anglicized German “blitzkrieg” meaning “lightning war”

LIFE

+



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A RAPID 24-hour count of all living species in a selected area.

OR, *if you are the Marine Invasive Species Subcommitee:*

A 1-3 hour count of all known or expected living marine invasive species in a selected area at the monthly low tide, in Sitka, Alaska

Goals of the Sitka Bioblitz

- DEMONSTRATE the feasibility of holding a marine invasive bioblitz in Southeast Alaska. (A successful marine bioblitz was held in Homer in 2008 by the Kachemak Bay Estuarine Research Reserve.)

- DOCUMENT the current distribution of invasive Botryllid tunicates (a.k.a sea squirts) in Sitka, compared to sampling by Ms. Verena Wang of SERC in 2007 and Heather Woody in 2008/2009.

- EXPERIMENT with the removal of large Botryllid tunicate colonies.

Goals of the Sitka Bioblitz

- SEARCH for other west coast marine invasive species not yet in Sitka, but that could have spread to Sitka.
- IDENTIFY vector opportunities for marine invasive species to be moved within and outside the Sitka area.
- INFORM and ENERGIZE Sitkans by engaging the community in an educational and fun activity!!

Target Organisms of Sitka Bioblitz

- Golden Star Tunicate: Botryllus schlosseri

Known to occur in Sitka from 2007-2009 surveys

Target Organisms of Sitka Bioblitz

- Violet Tunicate: Botrylloides violaceous

Known to occur in Sitka from 2007-2009 surveys

Target Organisms of Sitka Bioblitz

- Common Sea Squirt: Ciona intestinalis

In Washington State

Not known to occur in Sitka

Target Organisms of Sitka Bioblitz

- Pacific Transparent Sea Squirt: Ciona savignyi

Flourishing in Hood Canal, Washington, associated with leaky septic systems

Not known to occur in Sitka

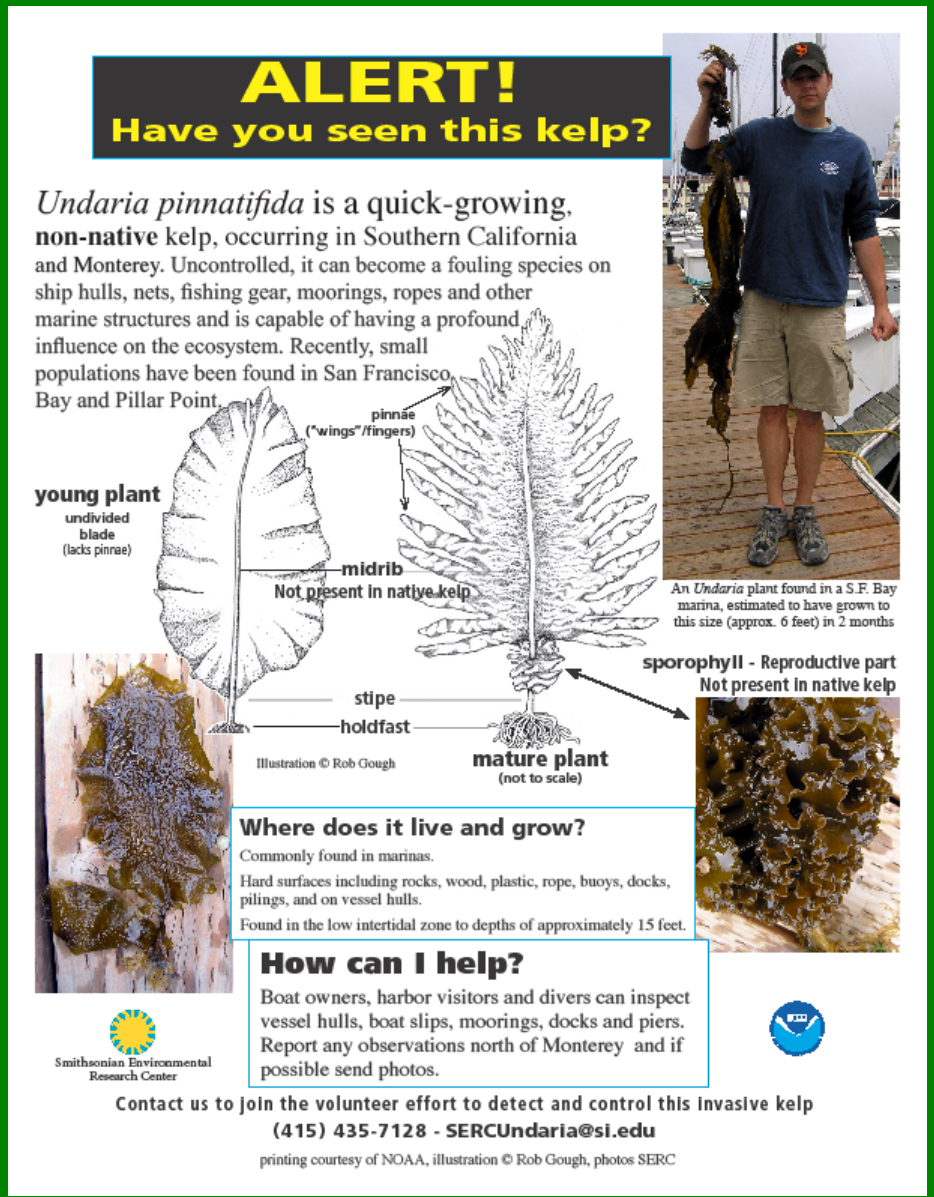
Target Organisms of Sitka Bioblitz

- European Green Crab: Carcinus meanus

California to British Columbia

Not known to occur in Sitka

Target Organisms of Sitka Bioblitz



- Japanese Kelp/Wakame: Undaria pinnatifida
- California as far north as San Francisco Bay

Not known to occur in Sitka

Target Organisms of Sitka Bioblitz

- Nasty Colonial Tunicate: Didemnum vexillum

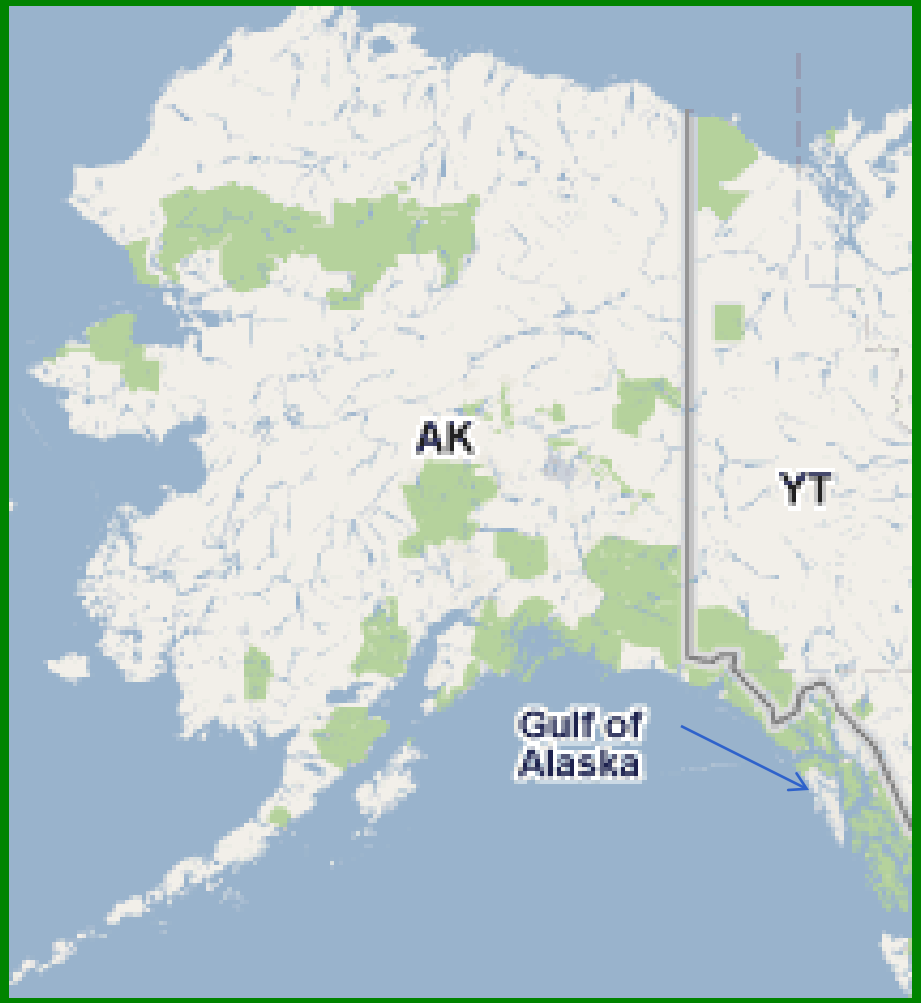
Was *not known* to occur in Sitka – more on this species in the next talk!

Four Types of Habitat Targeted

1. Shoreline between high and low tide.
2. Docks
3. Boat Hulls
4. Aquaculture Equipment
5. All to be surveyed at -2 foot tide for 1 to 3 hours on Sunday morning, June 13, except Whiting Harbor, site #10, accessible only by boat, on Saturday, June 12.

Photos: L. Shaw, Katharine Miller, Marnie Chapman

Sitka Sampling Locations



Sitka, Alaska
Baranof Island

Sitka Sampling Locations by visual search

1. Ferry Terminal
2. Cove Marina
3. Eliason Harbor
4. Thomsen Harbor
5. ANB Harbor
6. Sealing Cove
7. Crescent Cove
8. Totem Flats
9. Sawmill Cove
10. Whiting Harbor Aquafarm

Sitka Sampling Locations: Whiting Aquafarm was sampled Saturday, June 12 by boat access

1. Ferry Terminal
2. Cove Marina
3. Eliason Harbor
4. Thomsen Harbor
5. ANB Harbor
6. Sealing Cove
7. Crescent Cove
8. Totem Flats
9. Sawmill Cove
10. **Whiting Harbor Aquafarm**

Sitka Sampling Locations: ANB Harbor was selected for a demonstration removal of tunicate colonies by divers

1. Ferry Terminal
2. Cove Marina
3. Eliason Harbor
4. Thomsen Harbor
5. **ANB Harbor**
6. Sealing Cove
7. Crescent Cove
8. Totem Flats
9. Sawmill Cove
10. Whiting Harbor Aquafarm

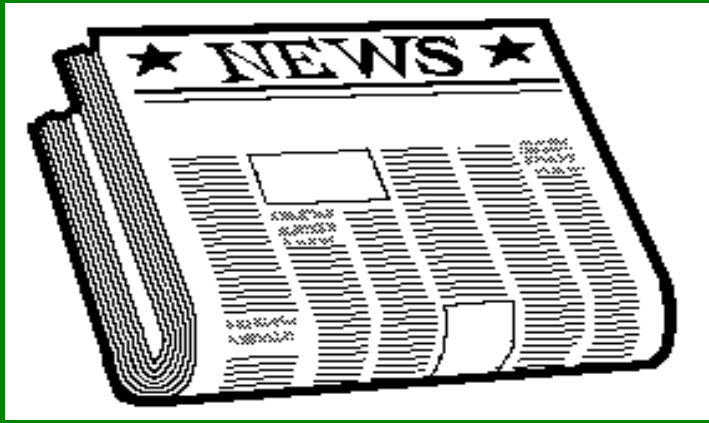
Sitka Sampling Locations: Crescent Cove was selected for green crab trapping

1. Ferry Terminal
2. Cove Marina
3. Eliason Harbor
4. Thomsen Harbor
5. ANB Harbor
6. Sealing Cove
7. **Crescent Cove**
8. Totem Flats
9. Sawmill Cove
10. Whiting Harbor Aquafarm

Personnel Were Assembled!

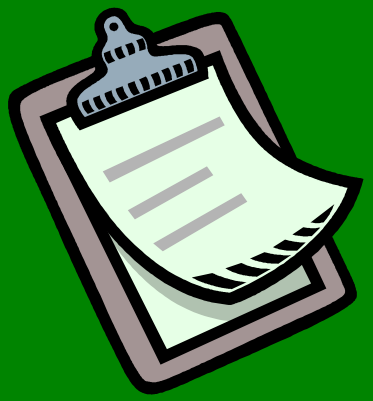
- ***Team Leaders for Community Volunteers***
- Carolyn Bergstrom, Marnie Chapman, Tammy Davis, Krissy Dunker, JonMartin, Katharine Miller, Heather Woody, Linda Shaw, Ken Rear
- ***Demonstration/Genetics Leaders***
- Linda McCann (big picture organization)
- & Sarah Cohen (tunicate species ID/DNA analysis for species ID)
- ***Sitka Sound Science Center Point Person***
- John Stein
- ***University of Alaska Juneau Team Leaders & Students***
- Carolyn Bergstrom, Dave Tallon, Sherry Tamone
- ***Divers and Diver Support***
- Troy Tydingco & Patrick Fowler (ADF&G) Bob Reid, Dave Gordon, Lynn Wilbur, Kelsey Jacobsen

Publicity both Pre and Post Event



- ***Posted Fliers About Town/Web***
- ***Word of Mouth***
- ***Radio Interviews on Friday in Sitka***
- ***Press Releases, Press Invited to Event***
- ***Several newspaper articles post event***

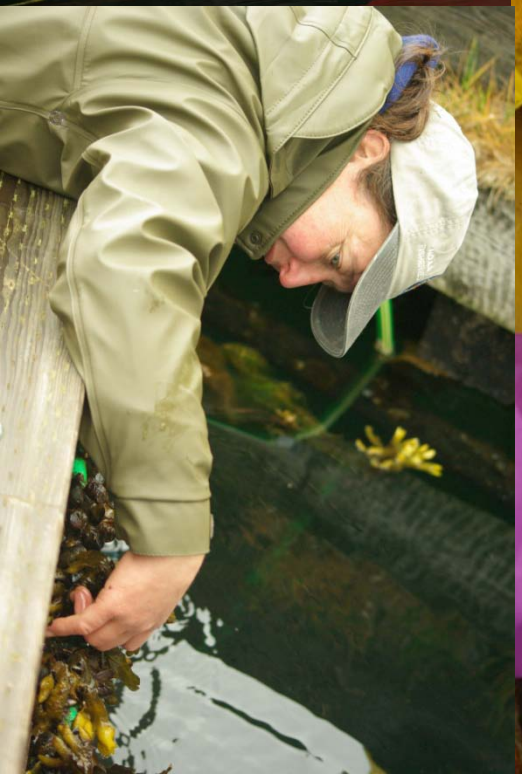
Permits



- ***Permitted by ADF&G Collection Permit***

Saturday, pre-Blitz training and lab session

Blitz Day!!! 8am to Noon Sunday



Results

	Site Name	Botryllus	Botrylloides	Didemnum
1	Thomsen Harbor	yes	yes	no
2	ANB Harbor	yes	yes	no
3	Sealing Cove	yes	yes	no
4	Crescent Harbor	yes	yes	no
5	Sawmill Cove	no	no	no
6	Cove Marina	no	yes	no
7	Eliason Harbor	yes	yes	no
8	Ferry Terminal	no	no	no
9	Totem Flats	n/a	n/a	n/a
10	Whiting Harbor Grant's Oyster Farm	yes	yes	yes – genetics testing for species identification

No differences in Botryllid distribution ,except, Sawmill Cove had no Botryllus in 2010, did in 2007, And Crescent Harbor had Botrylloides in 2010, not in 2007. No green crab caught. D.vex found Whiting Harbor, subject of next talk.

Botryllid Tunicates Were Partially Removed from One ANB Harbor Dock by Divers, Killed by Immersion in Fresh Water and Disposed at Upland Site near Sage Building

Native Live Organsims Were Placed in the Sage building educational salt water touch tanks.

Native Corella demonstrating the origin of the common name “sea *squirts*”

Post-Blitz Visit of Boat Grid on Monday, June 14: Botrylloides Found

Photo Credits:

Marnie Chapman
Sarah Cohen
Gary Freitag
Charles & Gretchen Lambert
Katharine Miller
Linda Shaw
Heather Mueret-Woody
Sitka Sentinel
www.ascidians.com

Questions?

Recent 2010 Finding of Didemnum vexillum in Sitka

Didemnum vexillum

Photo Janna Nichols

Target Organisms of Sitka Bioblitz

- Nasty Colonial Tunicate: aka Marine Vomit
- Glove Leather Tunicate: Didemnum vexillum

Photo : L. Shaw

Cryptic origin, now found in Japan, Europe, New Zealand, Prince Edward Island Canada, New England, California, Oregon, Washington, and British Columbia… BUT

Was *not known* to occur in Alaska!!

Other West Coast Discoveries This Year

Discovered by Oregon Coast Aquarium and REEF divers in Winchester Bay, Oregon in February, 2010 on a rock jetty, mooring lines and stringers near an oyster farm …

and by a marine biology class in Coos Bay, Oregon on some tires and VEXAR nylon mesh substrate samplers in April, 2010.

Photos courtesy Sam Chan, OSU, Corvallis

Didemnum vexillum was discovered in Whiting Harbor on Saturday, June 12 field trip


THE WHITING HARBOR AQUAFARM
Photo:L. Shaw

Tammy Davis of ADF&G pulls up
Japanese lantern, assisted by Kris
Larsen of ADF&G

Photo: L. Shaw

: L. Shaw

SUCCESS!!

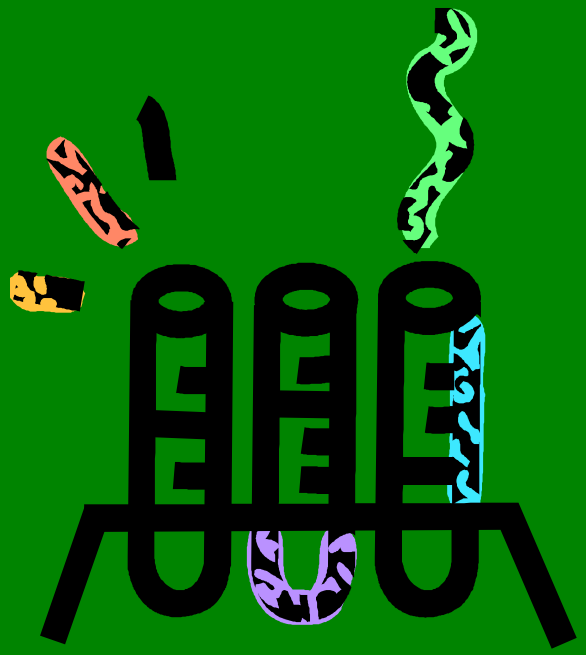
Photo: L. Shaw

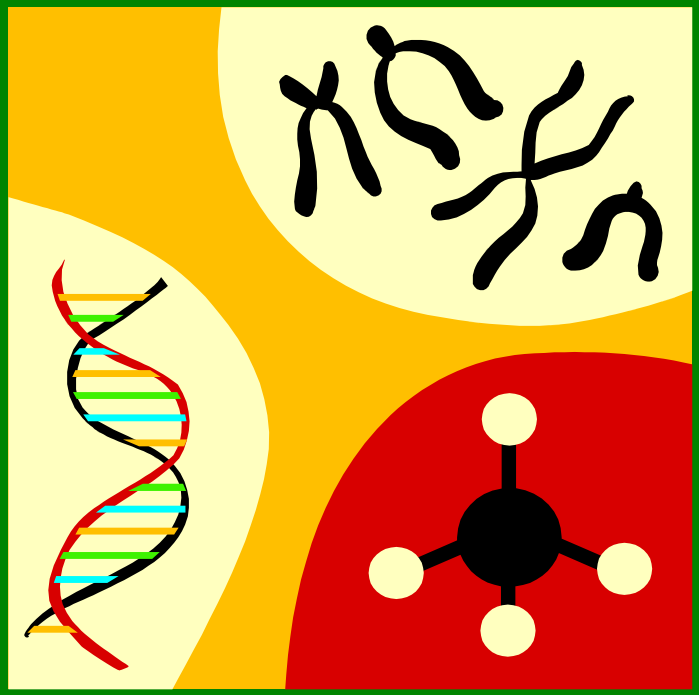
Oh My Gawd!

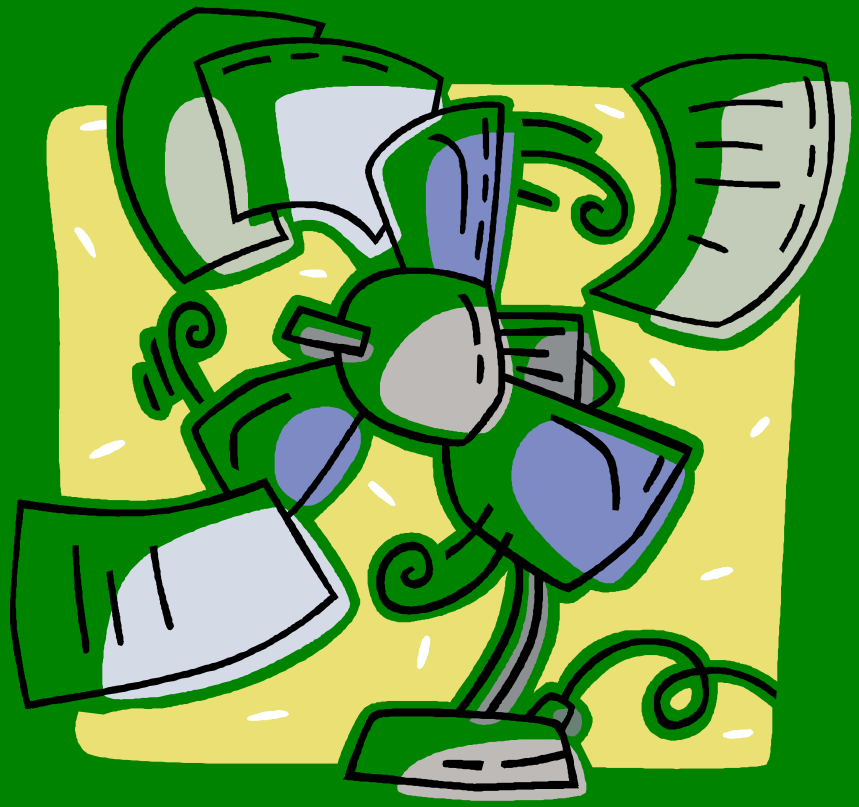
WHAT IS IT?!?!

Photo: L. Shaw

Samples were taken for genetics analysis and analyzed by Dr. Sarah Cohen of Romberg Tiburon Center - San Francisco University, confirming the specimen as *Didemnum vexillum* in early August, 2010







WHY IS THIS ORGANISM OF CONCERN????

http:www.pnwscuba.com/invasives

REEF DIVER IN PUGET SOUND DEMONSTRATING ORIGIN OF NAME

"ROCK VOMIT"

Didemnum vexillum is an aggressive invader that grows rapidly and has few known natural predators. It creates metabolic toxins that help it smother substrates and other organisms to create monoculture infestations from intertidal, subtidal to deep sea habitats, *for example*.

Didemnum vexillum is a threat to: *Mariculture*

British Columbia mariculture cages smothered by D. vex, Photo by Gordon King

D. Vex will grow on cages and mariculture organisms alike, creating a nuisance and reducing productivity

Andrew N. Cohen
Didemnum sp. A covering a native oyster (*Ostrea conchaphila*) in San Francisco Bay.

Alaska mariculture is a potentially $100 million business and currently has 25 operating shellfish farms, 15 in Southcentral and 10 in Southeast with oysters as the primary crop (Seafood News.Com, 09/23/10)

Didemnum vexillum is a threat to: *Commercial Groundfish Fisheries*

CASE STUDY: Georges Bank. D. Vex was present in New England's intertidal since the 1980s, then jumped to Georges Bank in 2002, and now has expanded to 143 square miles of seabed.

Northern Georges Bank. Water depth 43 m (141 ft). November 1, 2003.
Photo credit: Page Valentine and Dann Blackwood, U.S. Geological Survey.

Northern Georges Bank. Water depth 47 m (154 ft). November 1, 2003.
Photo credit: Page Valentine and Dann Blackwood, U.S. Geological Survey.

Georges Bank bottoms with early (left) and later (right) D. vex infestations

Studies suggest that groundfish are unable to penetrate D. vex mats to feed on benthic prey beneath, such as worms. Worm populations increase under D. vex mats and groundfish stomachs are found with D. vex fragments as they attempt to feed. Valentine et al., 2007

Didemnum vexillum is a threat to: *Ecosystem Integrity*

A 2009 study by Mercer et al. in Long Island Sound concluded that :

D. vex mats essentially “glue” the substrate to change the seafloor from a 3-D to a 2-D environment. Benthic infauna increase in numbers under mats possibly due to protection from predators such as *crab and demersal fish*. Documented a gastropod snail predator of D. vex, *Anachis* (dove snails) that eats both dead and live D. vex . Expressed concern for lobster that rely on pebble-cobble habitat being altered by D. vex.

Greedy Dove Snail: Do these occur in Alaska?

D.Vex and Diplosoma listerianum growing on eelgrass, photo by D. Blackwood, USGS. Diplosoma is another invasive colonial tunicate in the Gulf of Maine

A 2009 study by Carman and Grunden on Martha’s Vineyard has documented the first known occurrence of D. vex encasing eelgrass blades. Eelgrass is an important habitat for primary productivity, shoreline stabilization and fish habitat.

D. Vex RESPONSE

A dive survey was conducted September 4-5, 2010 by ADF&G Commercial Fisheries Divers to map the distribution of D. vex in Whiting Harbor.

“ It is probable that D. vexillum is present along the shoreline boulders/rip-rap from the southern (ocean side) to the northern (airport side).

Major concentrations were also found under the green float house, extending over to the small island to the northwest, and under the mariculture site.

D. vexillum was found covering most debris items in these areas, such as hanging or sunken lantern nets. (There is a submerged aquafarm in Whiting Habor.)

Heavy coverage was observed covering sections of kelp and kelp holdfasts, as well as on small live crabs.

” Kyle Hebert, ADF&G Region I Commercial Fisheries Division “

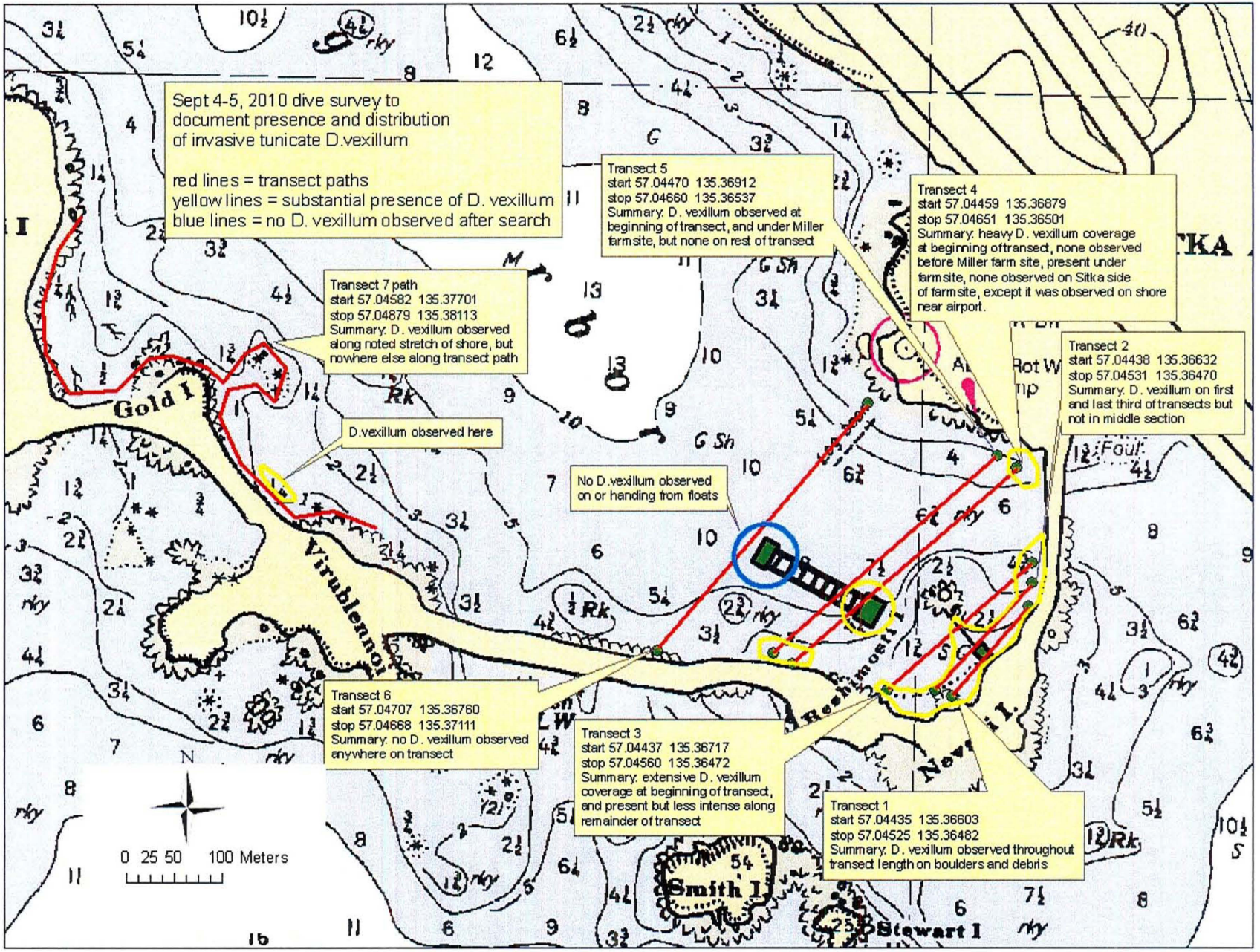


Figure 1. Chart of dive transects completed in Whiting Harbor, Sitka, Alaska during September 4-5,2010 to document presence of invasive colonial tunicate, *Didemnum vexillum*.

Photos: ADF&G

Didemnum vexillum overtakes mussels and seaweed in Whiting Harbor, Sitka.

D. Vex RESPONSE

AND:

- Additional Assessment of Distribution
- Education and Outreach for Containment
- Eradication Plan

FUNDING OUTLOOK

- $79K from USFWS to ADF&G (way to go Denny Lassuy and Tammy Davis!)
- A portion of the Alaska SeaGrant Invasive Species Grant at $250K/year for 2011 and 2012 (way to go Gary Freitag and Greg Ruiz!)
- Agency budget requests

OTHER FUNDING OPPORTUNITES?

QUESTIONS?

Daily Sitka Sentinel