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Salish Sea Ecosystem Conference

2014 Salish Sea Ecosystem Conference
(Seattle, Wash.)

Apr 30th, 1:30 PM - 3:00 PM

The Kelp of British Columbia and their Environment

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On The Kelp of the West Coast of Canada and Beyond

Louis Druehl

Bamfield Marine Sciences Centre,
Canadian Kelp Resources, Ltd.

(Supporting Kelp Farming, Restoration, Appreciation)

Bamfield, BC, Canada, V0R 1B0

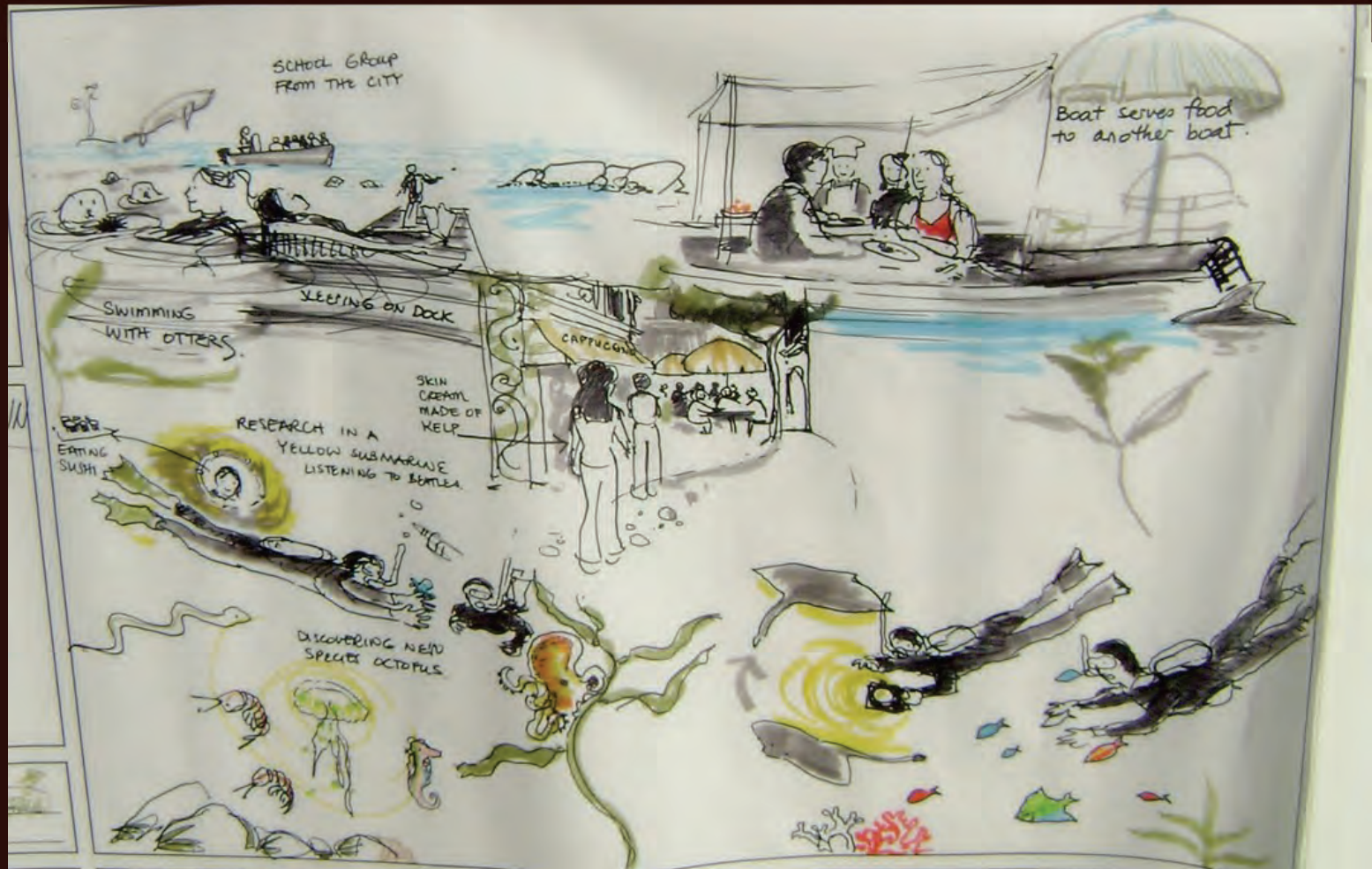
Presentation design:

Jean Richardson, BMSC



Postels & Ruprecht 1840

Kelp Species – Endless Forms



Drawing from Kelp Forest Diversity Youth Forum

Saccharina latissima
Sugar Kelp



Laminaria setchellii
Kombu



Pleurophycus gardneri
One-ribbed Kelp



Costaria costata
Five-ribbed Kelp



Cymathera triplicata
Three-ribbed Kelp



Saccharina sessile
Sea Cabbage



Alaria marginata
Winged Kelp



Pterygophora californica
Walking Kelp



Eisenia arborea
Forked Kelp



Egregia menziesii
Feather Boa Kelp



Photo by Colin Bates

Nereocystis leutkeana
Bull Kelp



Postelsia palmaeformis
Sea Palm



Photo by Colin Bates

Macrocystis pyrifera
Lesser Giant Kelp Variety



Photo by Colin Bates

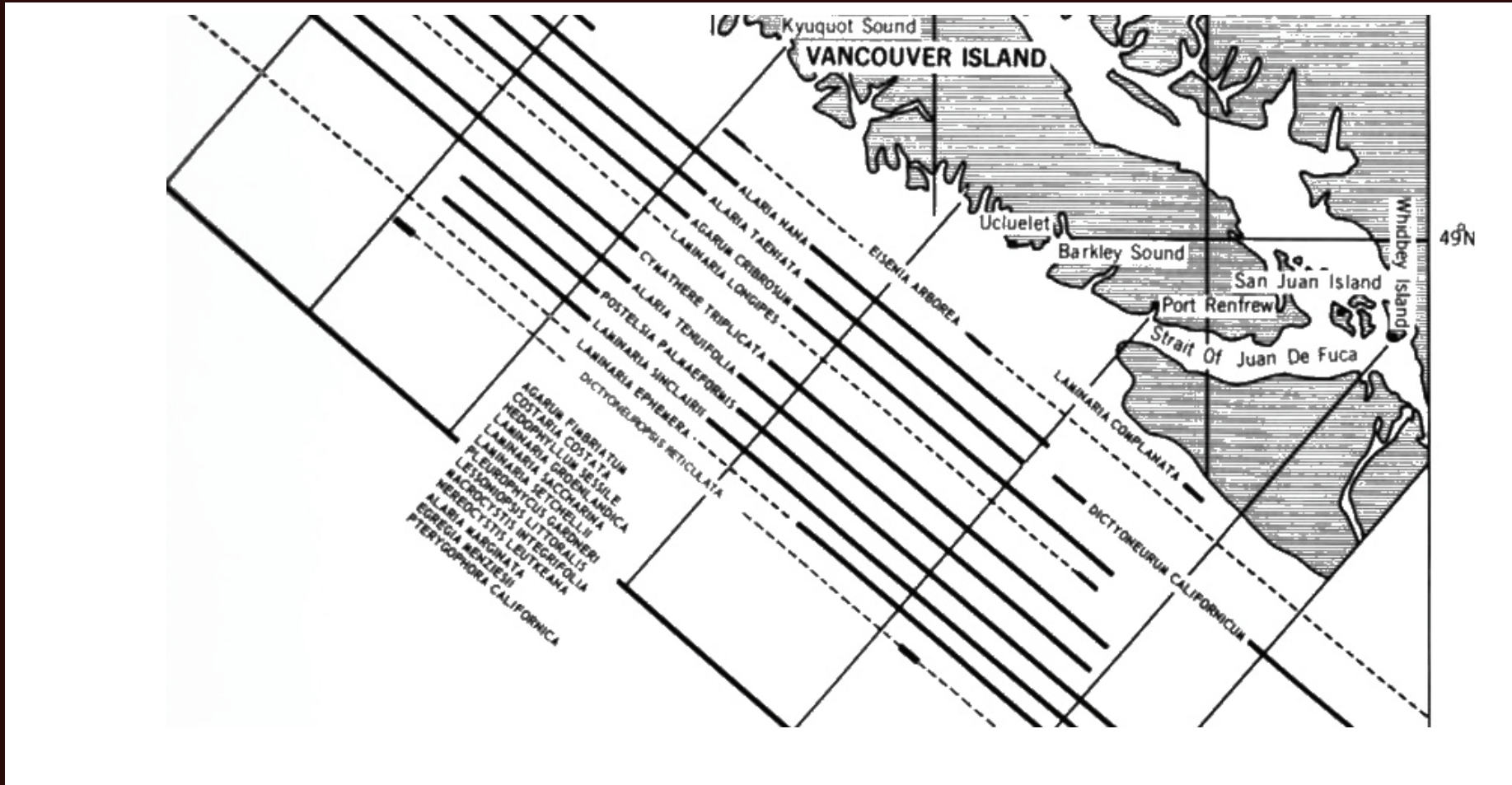
Pelagophycus porrea

Elk Kelp



Kelp Distribution along Vancouver Island

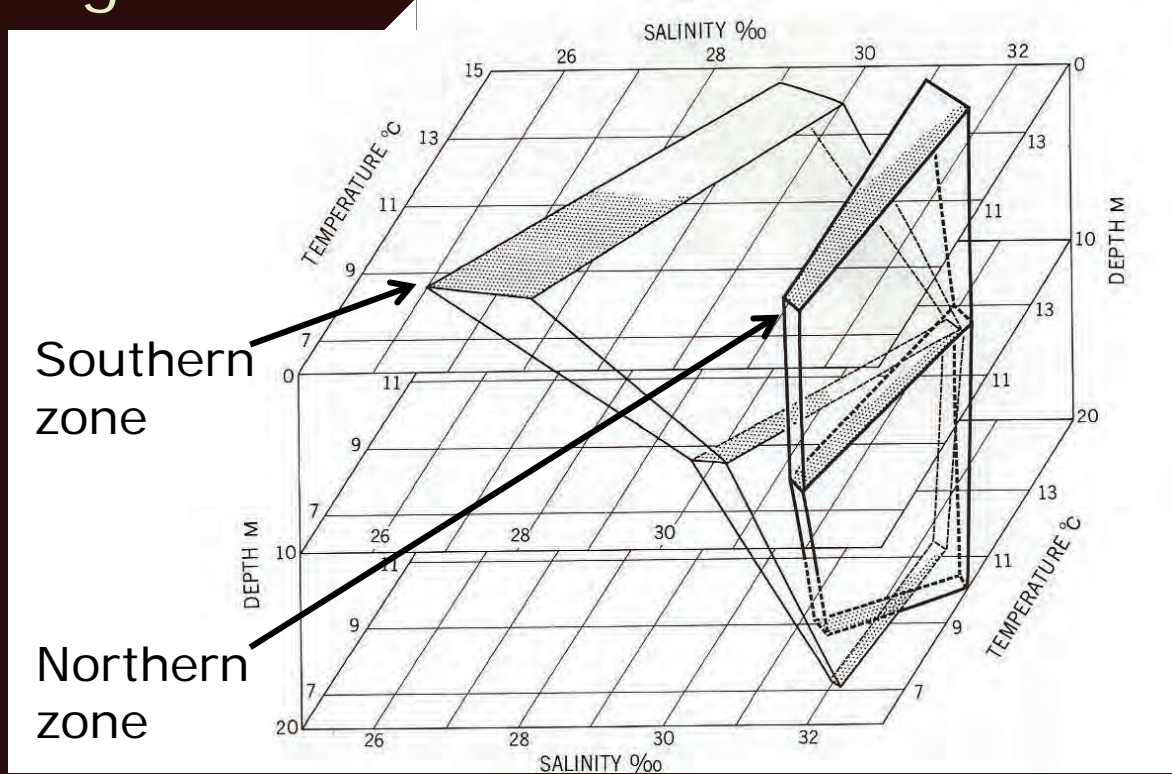
General distribution of Laminariales.



Druehl, 1970. Phycologia 9(3-4): 237-247

Kelp Submergence in Relation to Temperature/Salinity/Light

Annual Temperature/Salinity polygons for floristic zones.



Druehl, 1981. Evolution Today: 55-6

Pleurophycus gardneri, the deciduous kelp,

Intertidal southern limits Fort Bragg, CA 38.5° N

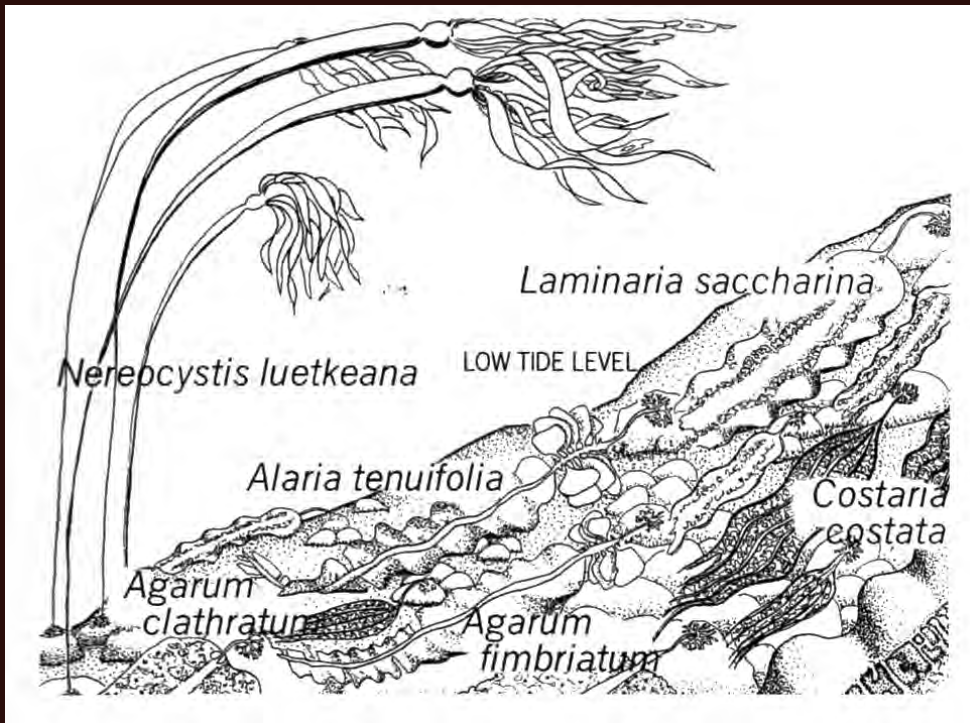
Subtidal (> 30M) southern limits Monterey, CA 36.6° N

Submergence extension about 400 km

Spalding et al. 2003. J. Phycol. 39:273-284

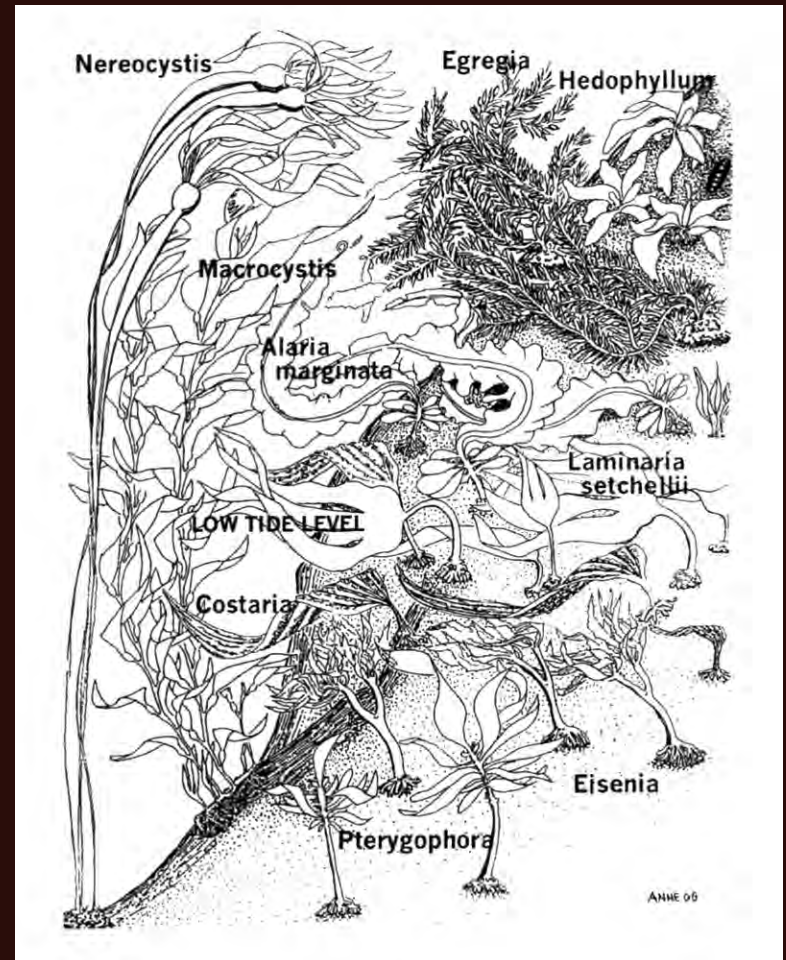
Typical Vancouver Island Kelp Floras

Inner Coast Flora

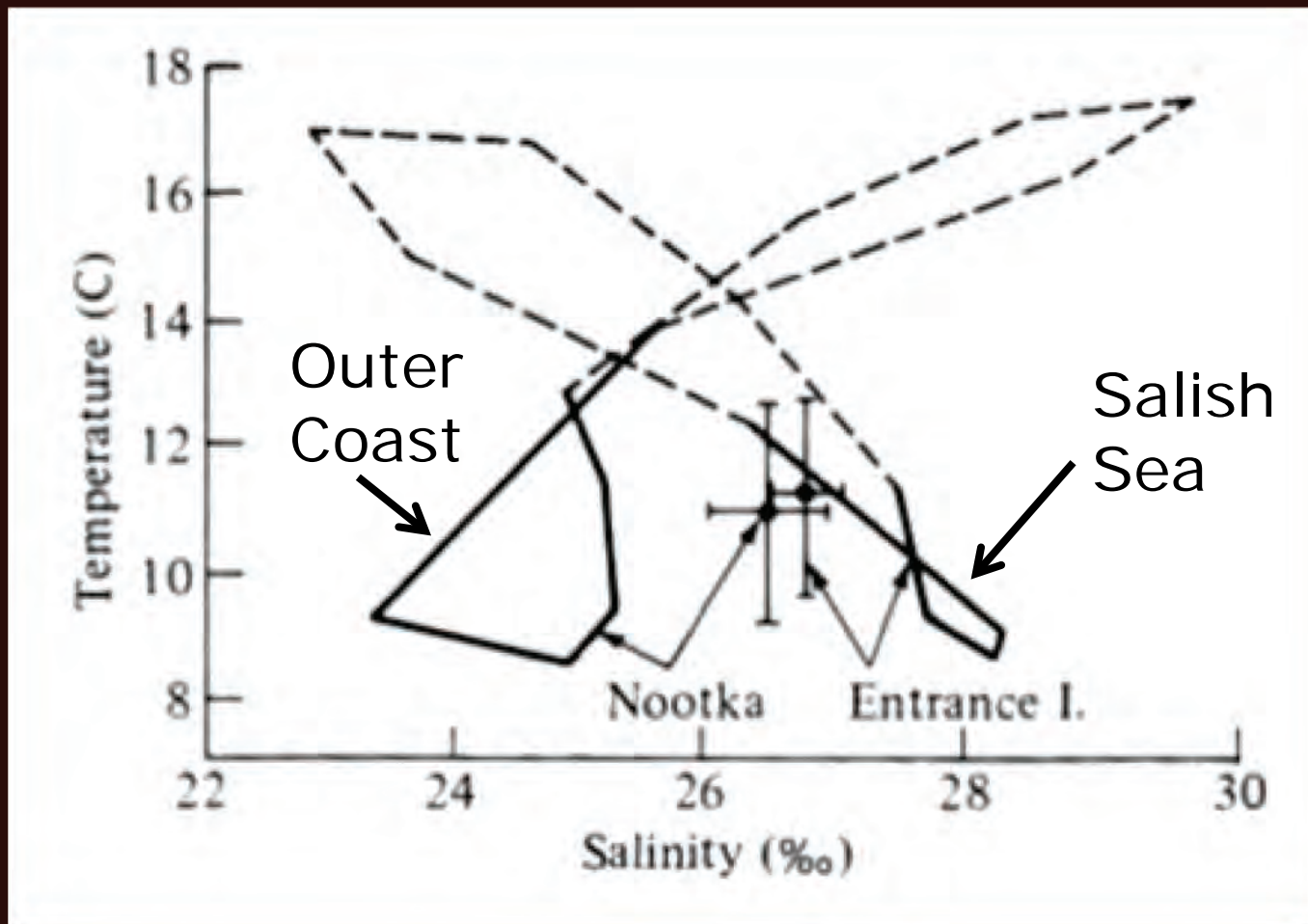


Illustrations by Anne Stewart

Outer Coast Flora



Annual Temperature/Salinity Polygons for Inner and Outer Coasts of Vancouver Island



From Druehl, 1978. *Can. J. Bot.* 56: 69-79.

Shifting Kelp Populations



Egregia menziesii
invading shore;
perhaps in response
to ocean warming.



Eisenia arborea,
Arami, possibly
introduced from
California with
ballast rock
37-48 ° N



Undaria pinnatifida,
Wakame, a recent
West Coast Asian
invader



Druehlia fistulosa,
Dragon Kelp has
decadal migrations
54-58 ° N

Kelp Impacts on Vancouver Island and Beyond

*Kelp primary productivity is the engine
that drives near-shore ecosystems.*

Druehl, Pacific Yachting, Oct. 2013

Giant kelp facilitated the colonization of
the Americas and local transport.

The Kelp Powerhouse

Detritus Production by Kelp

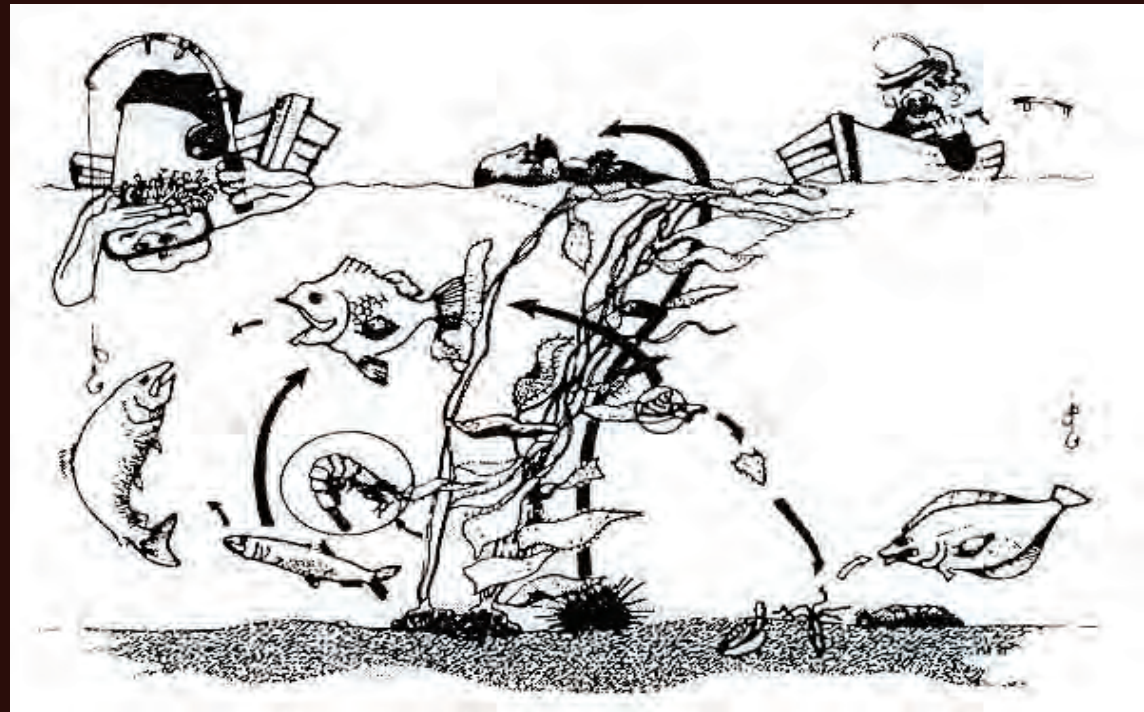
“...all three species [of kelp] completely renewed the tissue in their blades between one and five times a year.”

K. Mann. 1973. Science 182:945.

Kelp-derived Carbon in Marine Animals

Mussel	38%
Barnacle	85
Rock Greening	68
Cormorant	48

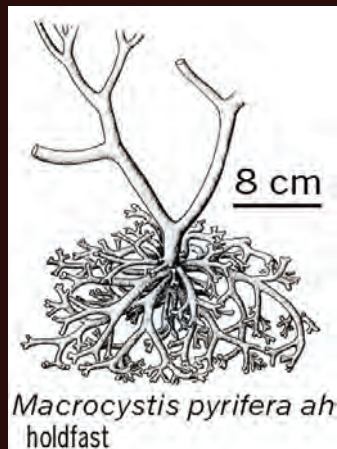
*Duggins, et al. 1989.
Science 245:170-173.*



Giant Kelp and the Movement of People

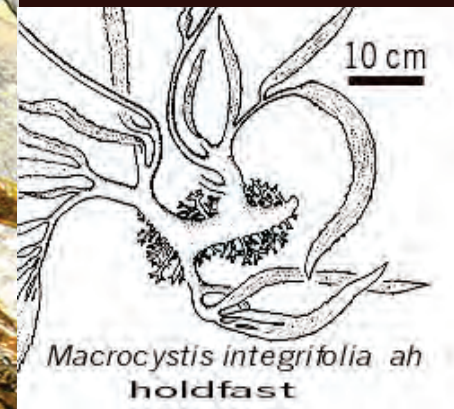
Giant Kelp

Up to 55 m long
Persists up to 10 yrs
Wave-exposed shores



Lesser Giant Kelp

Up to 30 m long
Persists up to 3 yrs
Wave-sheltered shores



Kelp Activities for Commerce

- Food
- Medicine
- Farming



Harvest for Sea Vegetables



Harvest for Pharmaceuticals



Kelp Farm Production

Farmed *Saccharina latissima* (Sugar Kelp):
12 kg kelp/meter rope



Sugar Kelp 1 Ha Farm Production

Harvested wet weight 48 MT

Calculated wet detritus 192 MT

Total wet weight produced 240 MT

Total carbon captured 7.5 MT

Young Farmed Kelp



Saccharina latissima, Sugar Kelp



Alaria marginata, Winged Kelp



Macrocystis pyrifera, Giant Kelp



Nereocystis leutkeana, Bull Kelp

Huu-ay-aht / Canadian Kelp: Fattening Sea Urchins for Roe Fishery



Kelp in Art, Recreation, Leisure, and Contemplation













Lady with the Five Ribbed Kelp, *Costaria*,
Sooke Harbour House Spa



Breakfast at Tiffany's

Macrocystis dress with
Fucus accessories

Ja Whitcome creation,
photo Billy Pipe



Beach Accessories

Find your kelp

