

US EPA ARCHIVE DOCUMENT

Alaska Clean Seas

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Oil Spill Response In Fast
Water And Currents

Presentation Overview



- Alaska Clean Seas Overview
- ACS Tactics Manual
- Fast Water Containment Tactics
- Fast Water Recovery Tactics
- Equipment
- Operational Limitations: Safety and Equipment



Alaska Clean Seas Overview



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Mission

To provide personnel, material, equipment, and training response capability for use in support of its members in preparing for, responding to, and cleaning up an oil spill within the area of interest.

Under ACS By Laws –

1. All members are entitled to call upon ACS and receive assistance in the above activities.
2. Members are also entitled to refer to ACS resources in their contingency plans, and to represent to regulatory agencies and others, that these resources are available to them in the event of a spill.



Current Members



■ Alyeska Pipeline



• Conoco/Phillips Alaska, Inc.



• BP Exploration (Alaska)



• Exxon/Mobil Production Company



• Anadarko, Pioneer, FEX, BRE



• Shell Oil – Newest Member





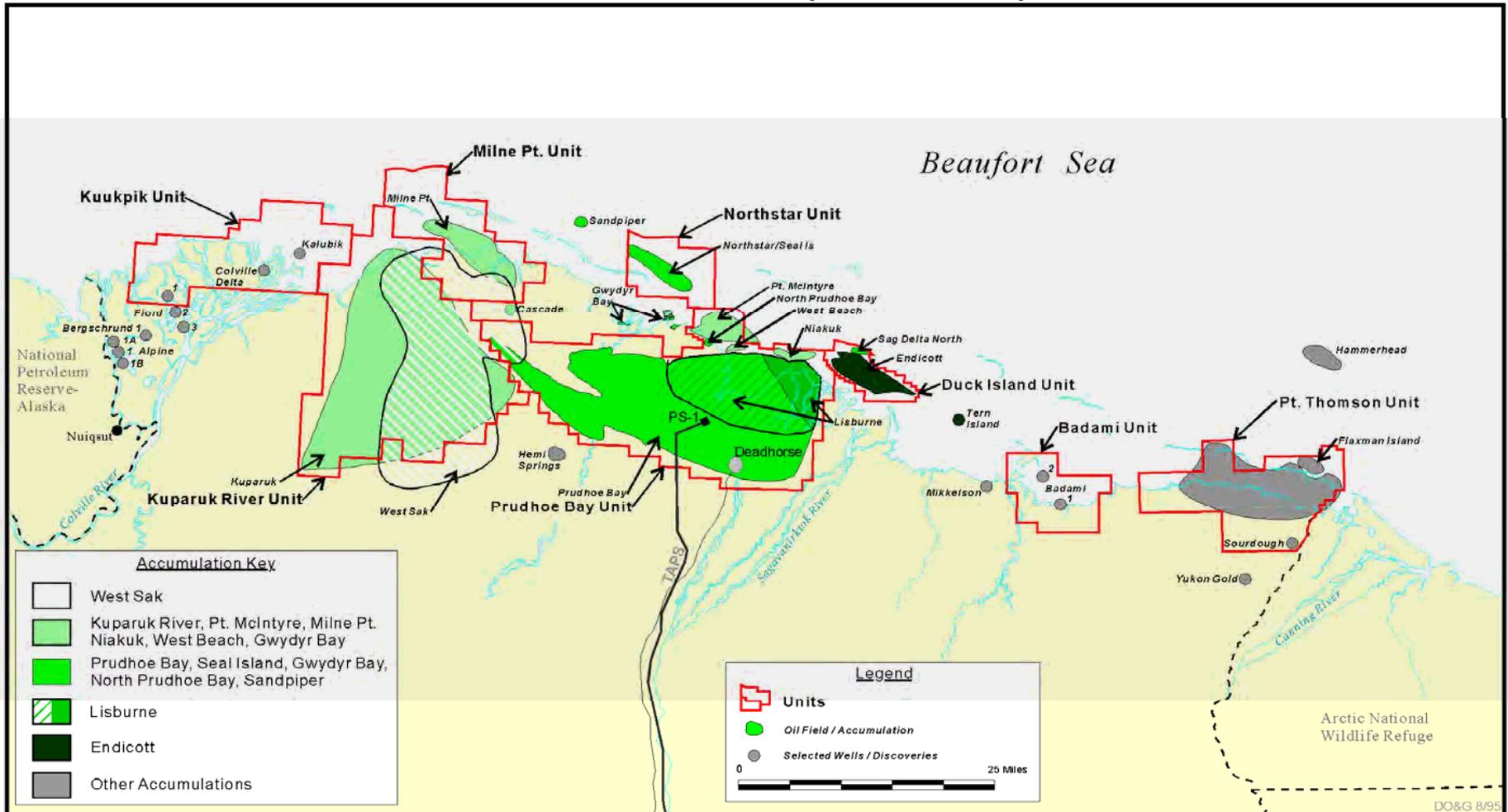
Current Area of Operations

Providing response services to the Alaska North Slope crude oil producers and the first 167 miles of the Trans Alaska Pipeline System.

Map of Coverage Area

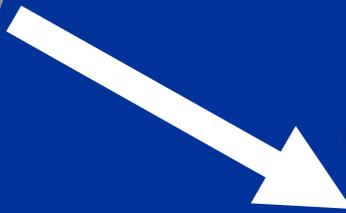


Central North Slope Unit Map



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Mile Post 0 to 167 of Trans Alaska Pipeline (TAPS)



TAPS Pump Stations



Equipment



Equipment is owned by the Co-Op and maintained on the North Slope. The inventory includes –

- 287,000 feet of boom (47.3 miles), 17,450 ft of which is Fire Boom
- 160 Skimmers (Over 33,000 Bbls/Hr. of Derated Recovery Capacity)
- Eight heli-torch aerial ignition systems
- 90 vessels
- Two 128 barrel and Twelve 249 barrel mini barges.



Manpower



ACS maintains approximately 70 full-time staff.



115 responders are available through the North Slope Spill Response Team (NSSRT).



Additionally, personnel are available from, Auxiliary Contract Response Teams (ACRT) and North Slope Village Response Teams (VRT).



North Slope Spill Response Techniques



- **Mechanical Recovery**
 - **Heavy Equipment**
 - **Skimmers**
- **In-Situ Burning**
 - **Heli-Torch**
 - **On Land**
 - **On Ice**

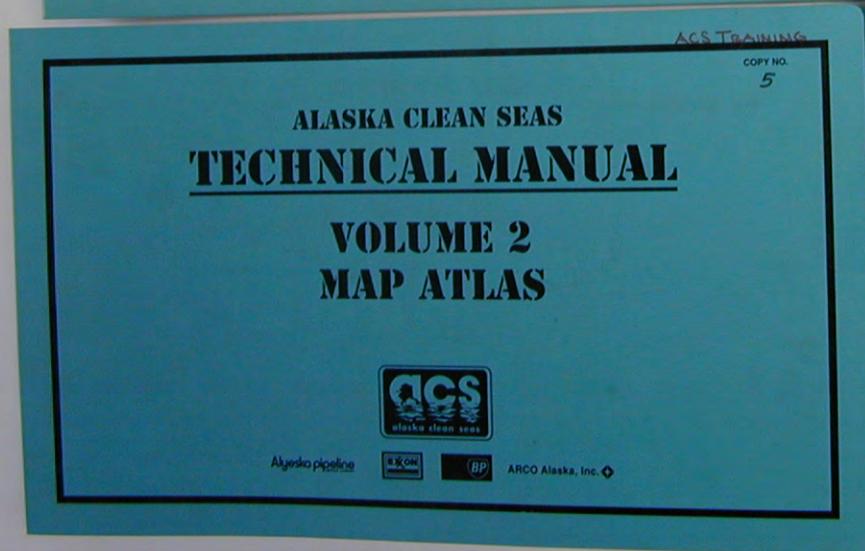
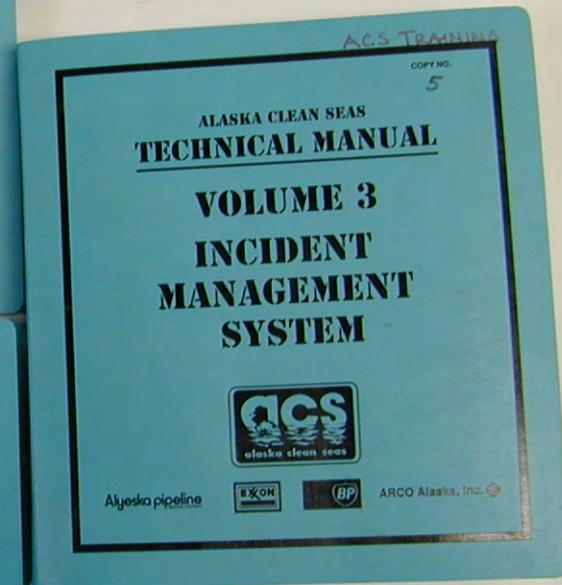
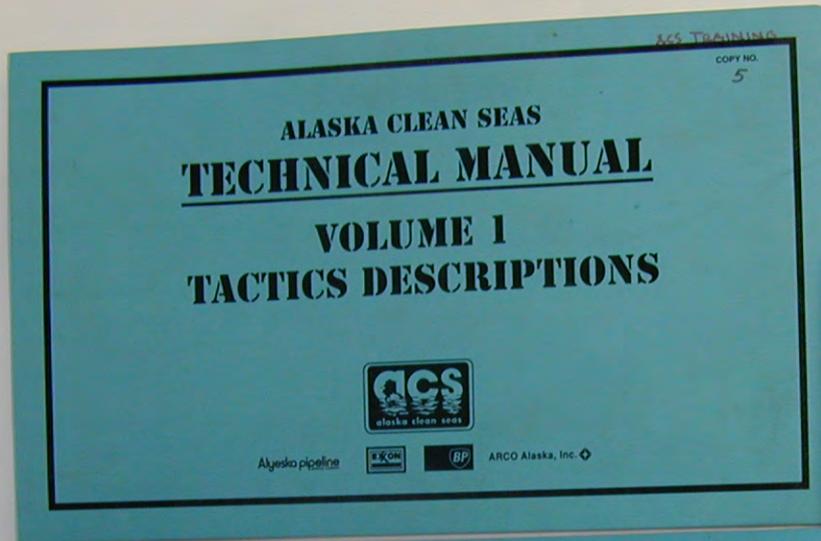


Response Environments



- Arctic environment: -50 F - +70 F
- Open water 3-4 months
- Tundra
- Fast water rivers
- Lakes, ponds
- Near-shore – 6” tide range
- Off-shore – primarily wind driven currents

ACS Tactics Manual



Tactics Manual Contents



- Safety
- CONTAINMENT
- RECOVERY AND STORAGE
- Tracking and surveillance
- Burning
- Shoreline cleanup
- Wildlife and sensitive areas
- Disposal
- Logistics and Administration

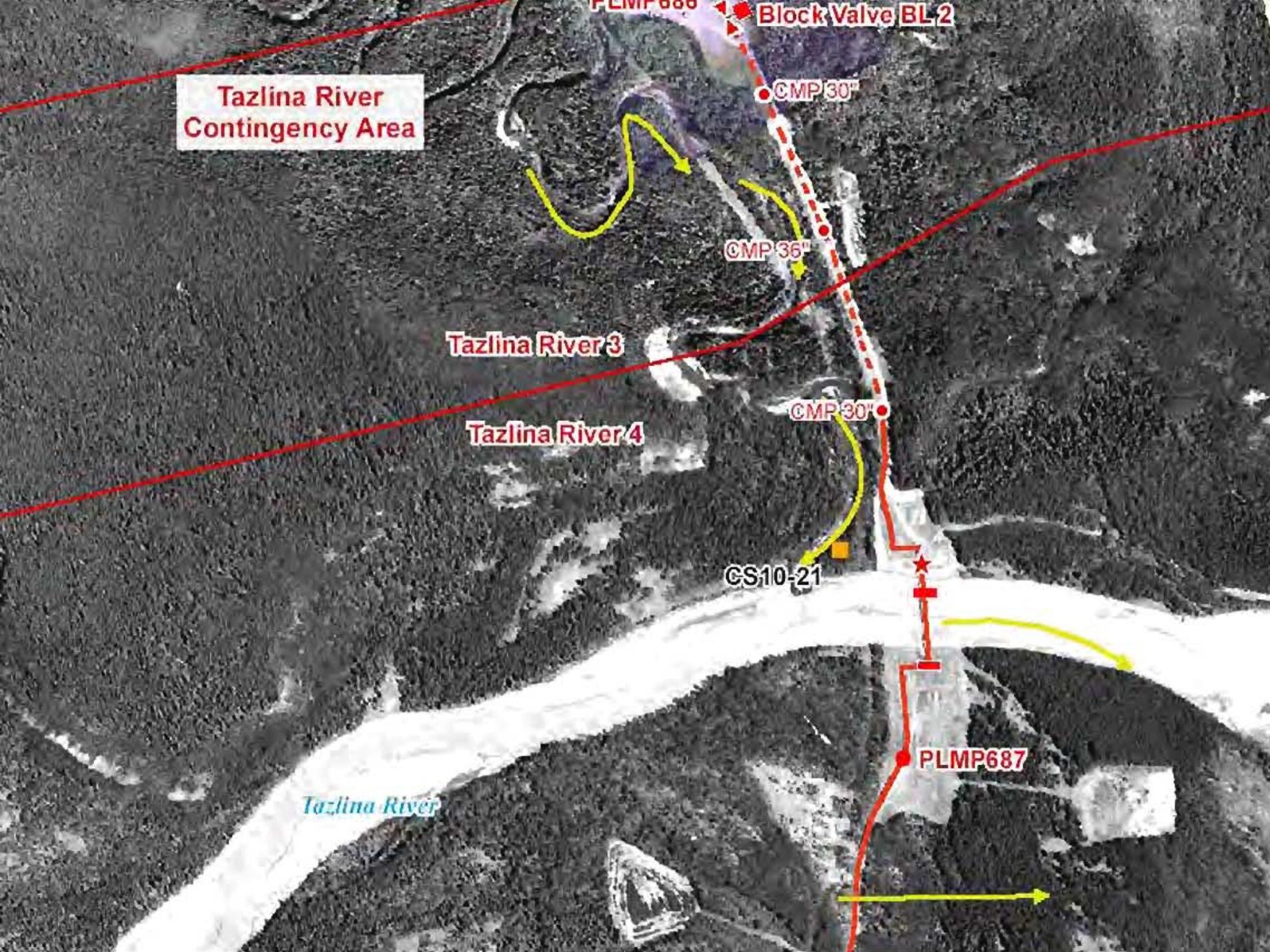
Containment Tactics In Fast Water And Currents



Criteria For Selecting Containment Sites



- **Containment Sites** are areas of opportunity that can enhance containment efforts. Preplanned containment sites are an essential component of our contingency plans. This section presents criteria for logical, systematic and consistent site selection.



**Tazlina River
Contingency Area**

Block Valve BL 2

CMP 30"

CMP 36"

Tazlina River 3

Tazlina River 4

CMP 30"

CS10-21

PLMP687

Tazlina River

Criteria For Selecting Containment Sites



- Channel configuration
 - Width
 - Depth
- Back Water (eddies) areas
- Side Channels
- Dry or Wet Ponds adjacent to rivers
with Containment and Recovery
Potential

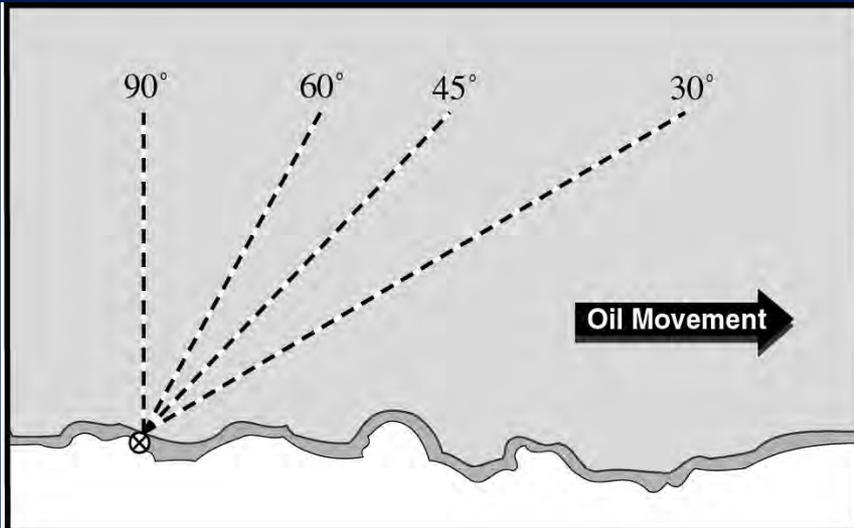


- Back Water (eddies)
- Side Channels
- Dry or Wet Ponds adjacent to rivers
- Containment and Recovery Potential

Containment Boom



Boom Angles



- 3 knots is upper limit ?
- Difficulty increases as boom angle gets steeper
- More boom required as angle gets steeper

Current (Knots)	Current (ft/second)	Boom angle relative to current, required to keep component of current <1/4
1.5	2.5	30° to 42°
1.75	2.9	25° to 35°
2.25	3.8	19° to 26°
2.5	4.2	17° to 24°
2.75	4.6	16° to 21°
3.00	5.00	15° to 19°

Length of Boom to Span Waterway



FEET OF BOOM REQUIRED

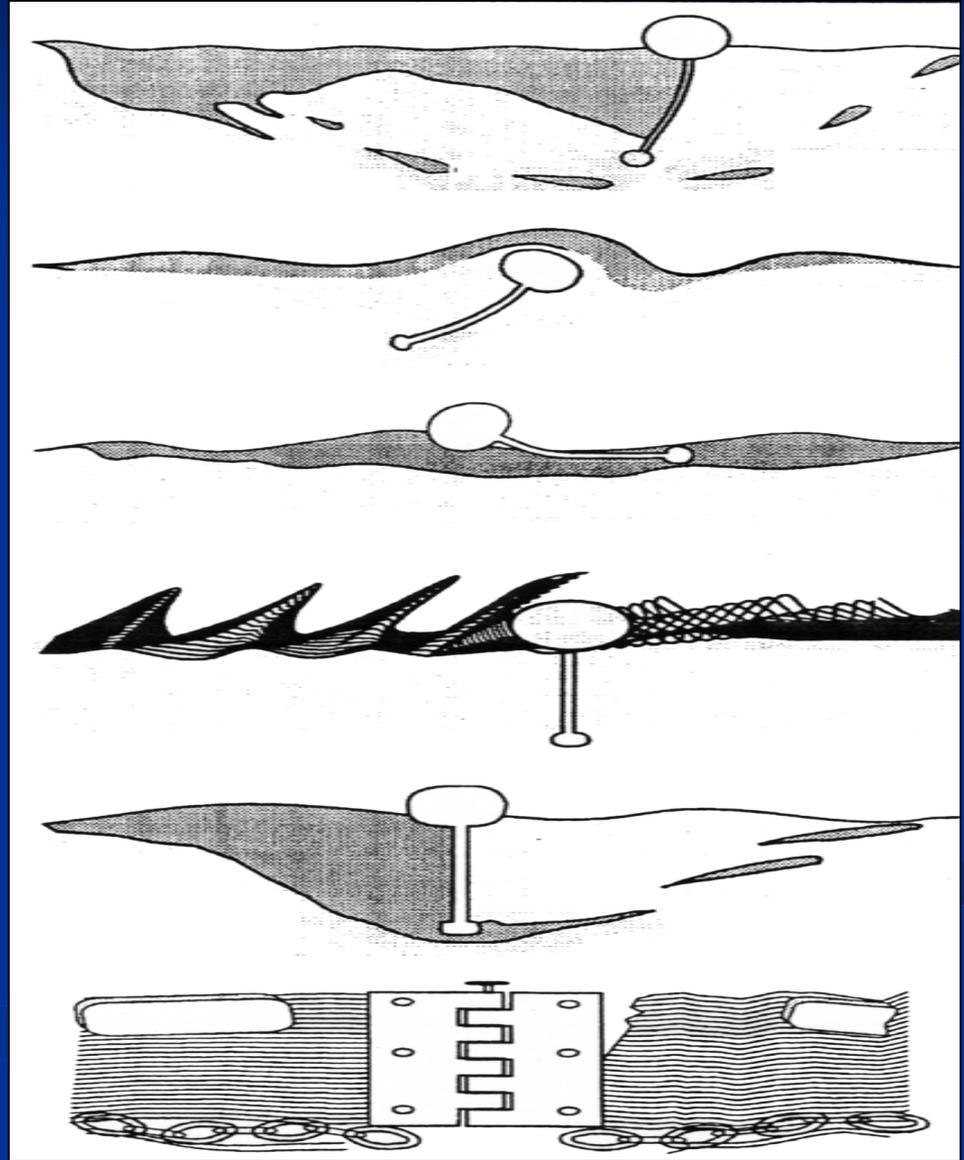
Waterway Width in feet

<u>Angle</u>	10	20	30	40	50	60
15	39	78	116	155	194	233
20	29	59	88	117	146	175
25	24	48	71	95	119	142
30	20	40	60	80	100	120
35	18	35	52	70	87	105
40	16	31	47	62	78	93
45	14	29	43	57	71	86

Oil Entrainment



- Shallow skirted boom
- Velocity of water
- Length of boom
- Design of boom
- Amount of oil in boom



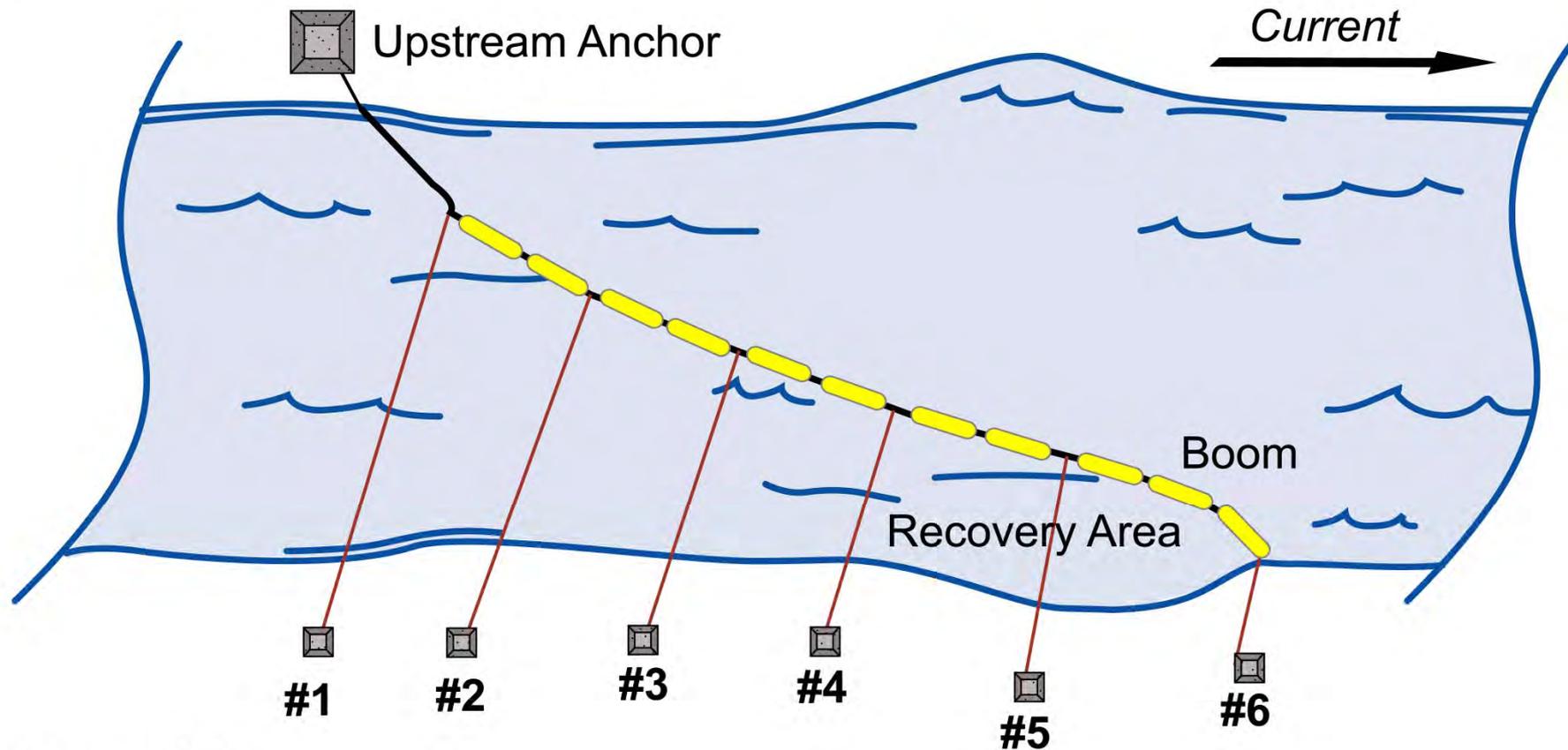
Fast Water Booming Tactics



C-8 Deflection Booming



Deployment Side



Recovery Side

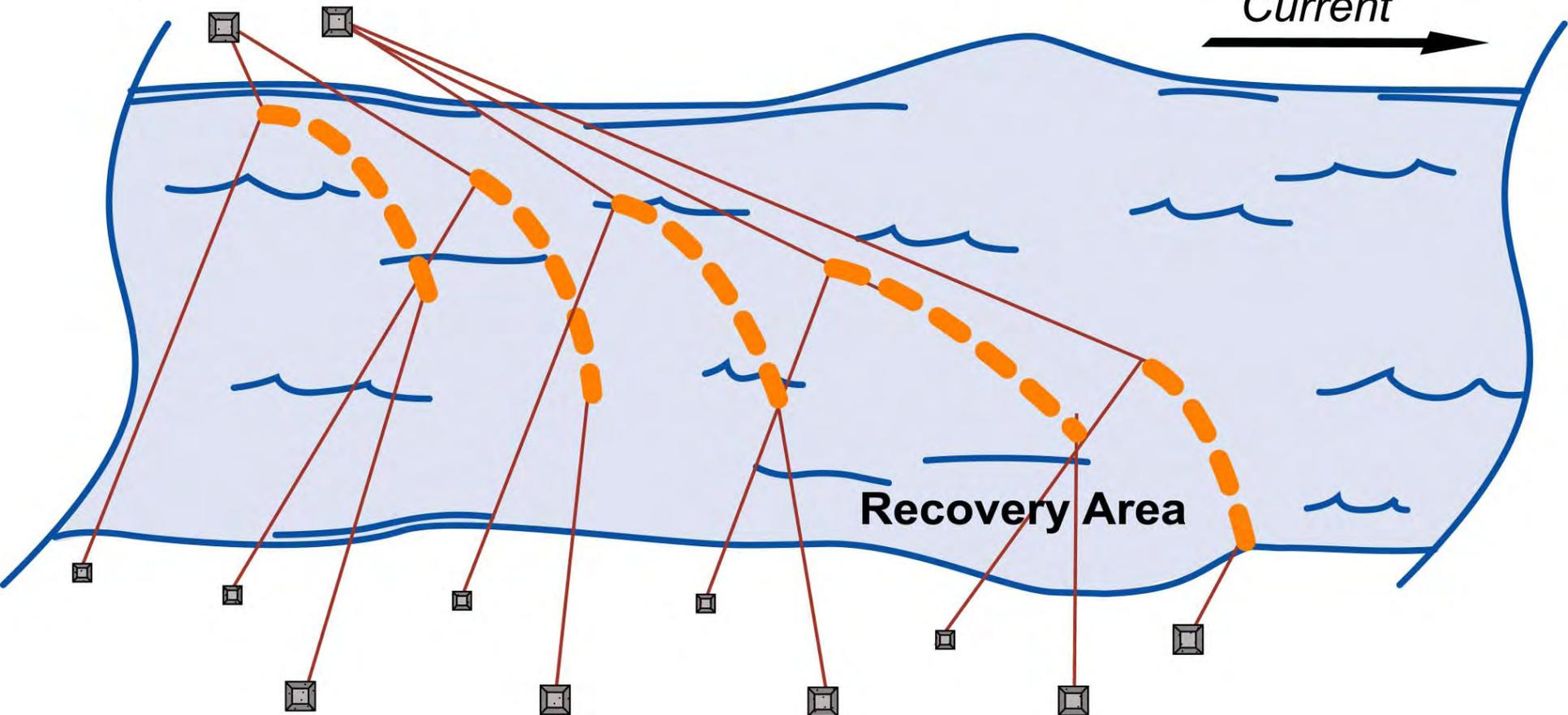


C-8 Deflection Booming Diversionsary (Cascade)



Upstream Anchors

Current



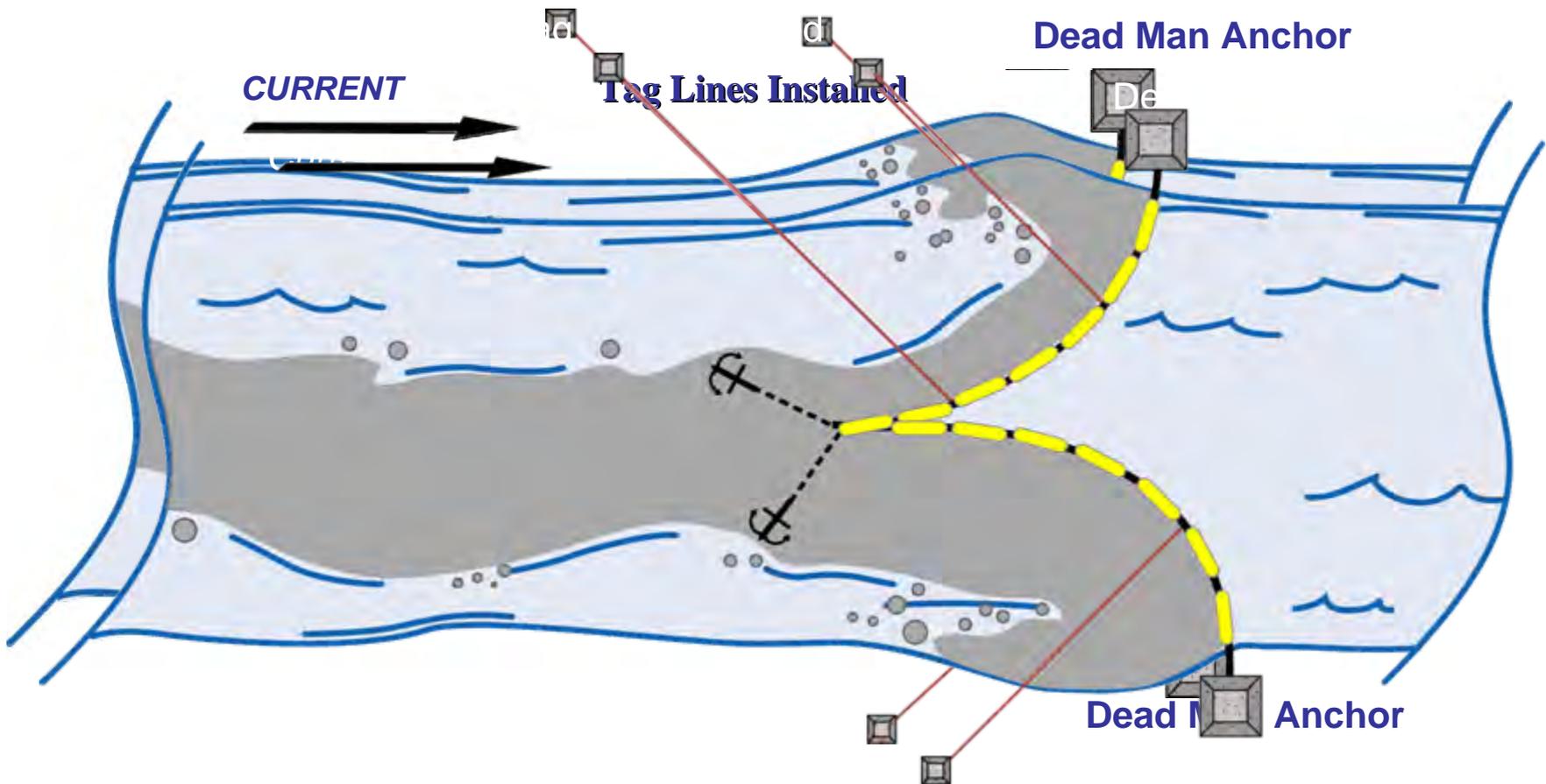
Recovery Area

Booms Tied to Anchors

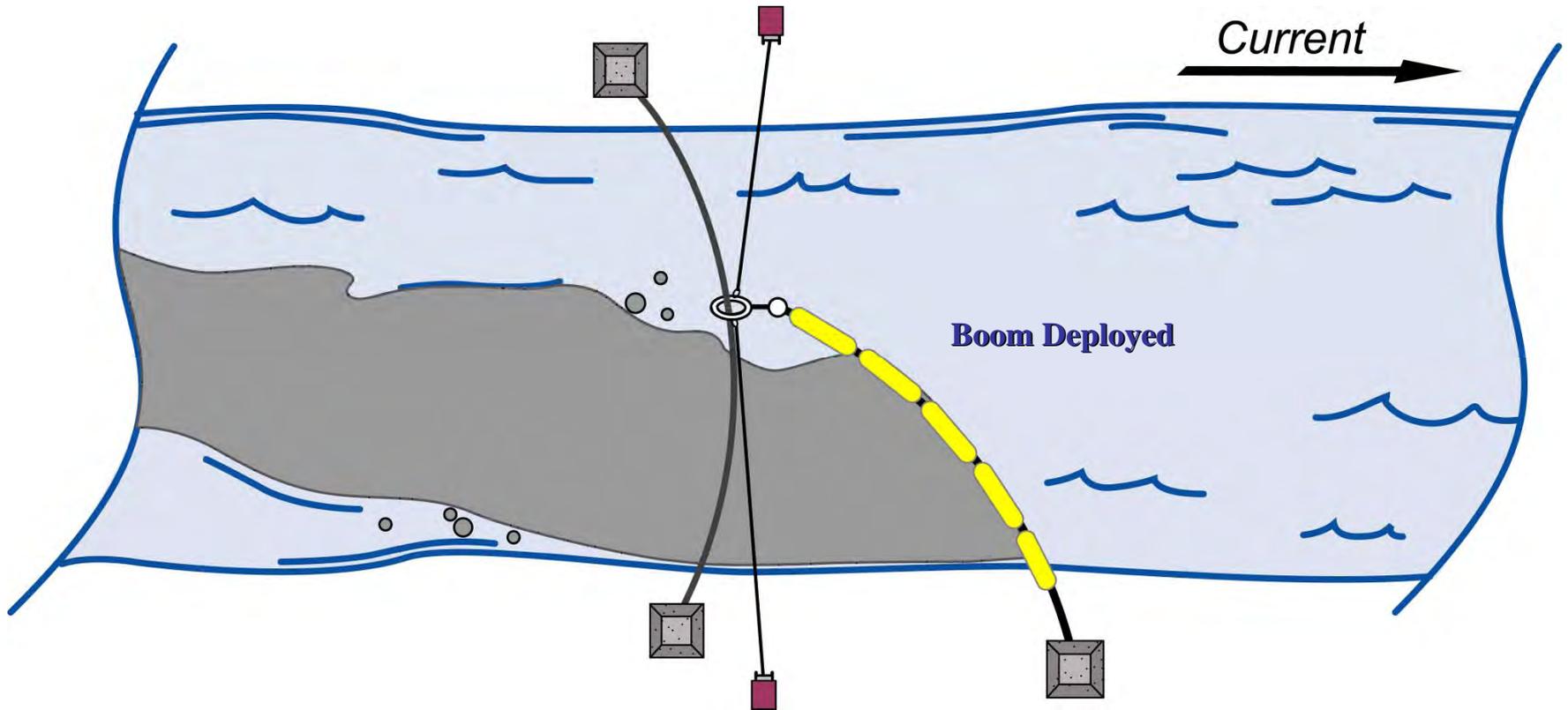


C-8 Deflection Booming

Chevron



C-8 Deflection Booming Catenary/Deflection Trolley





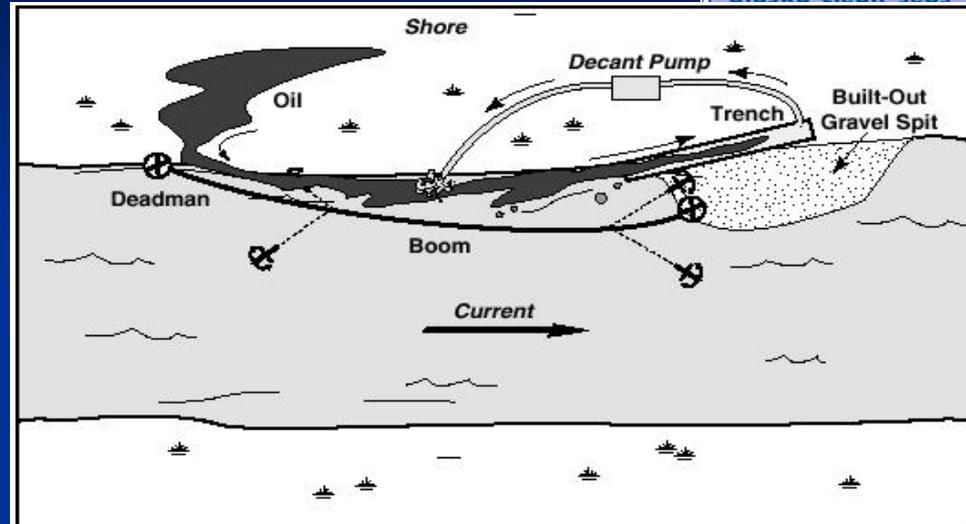
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C-7 Deadarm Trench



- A natural or man-made deadarm trench can be used to collect and contain oil from a land based spill.



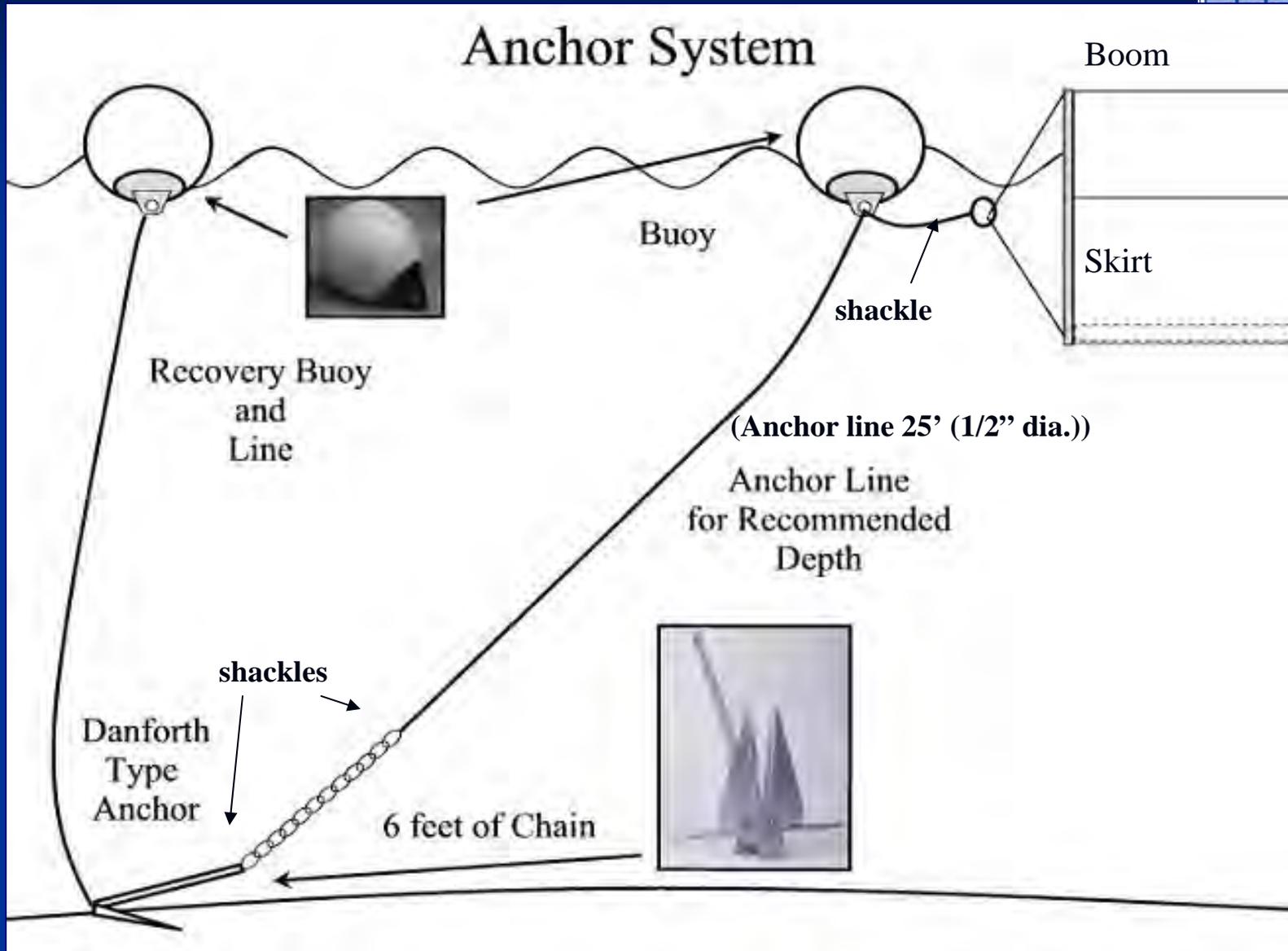


Boom Anchor Systems

Boom Anchor?



Deep Water Anchor



Fast Water Anchor Plates









Boom Rudders

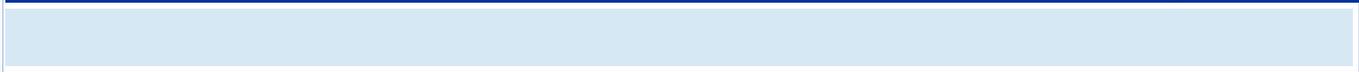








Boom Vanes



Boom Vane Video



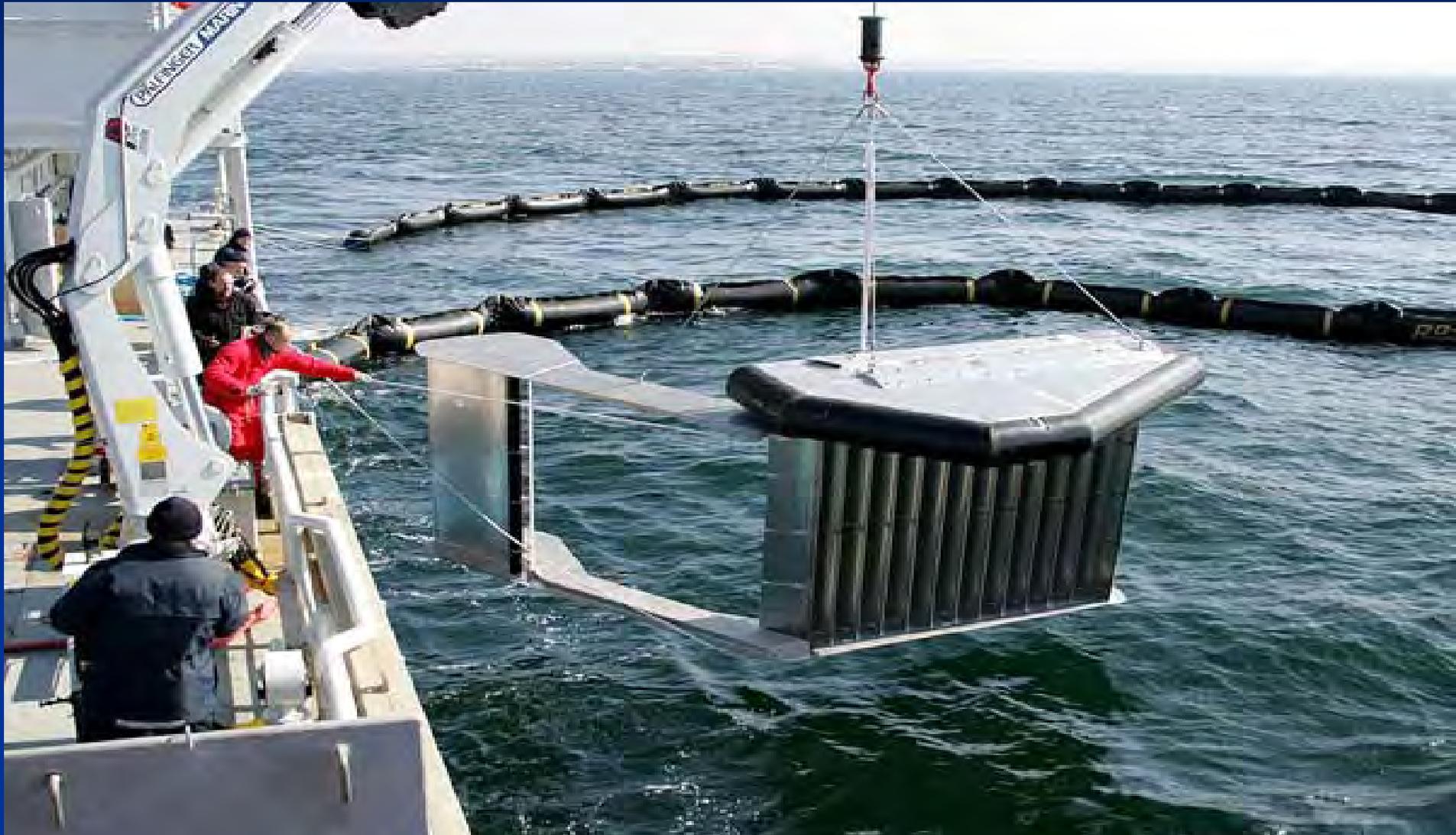
Boom Vanes



27 in APSC Inventory for 2005 (24", 48" and 2 meter)



Boom Vane (2 meter, offshore)







2 Boom Vanes on Tanana River



Boom Vane #2



Boom Vane #1



Aqua Guard Skimmer









Pipe Dams

Underflow and Overflow

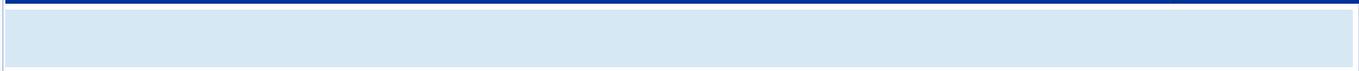


Underflow Dam Sand Bags





Mega-secure Dam





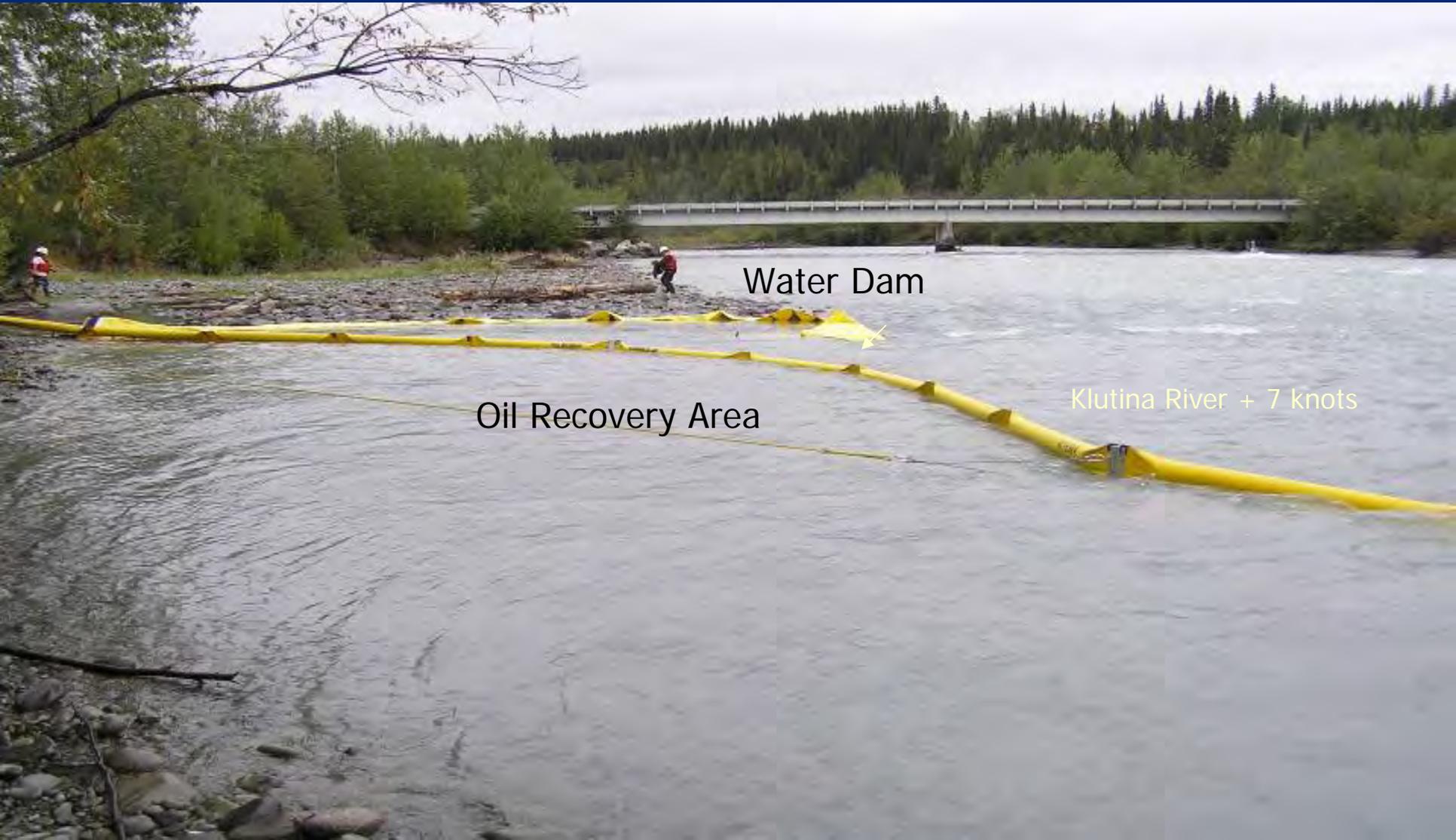


MEGASECUR.COM





Mega-secure Dam With Boom and Boom Vane



Water Dam

Oil Recovery Area

Klutina River + 7 knots

Mega-secure Dam with Boom



Klutina River

Quiet Water

12" Fast Water Boom

21" x 35' Water Dam

This was fixed later



Fast Water Skimmers



Circus Wier Skimmer



Pedco Wier Skimmer



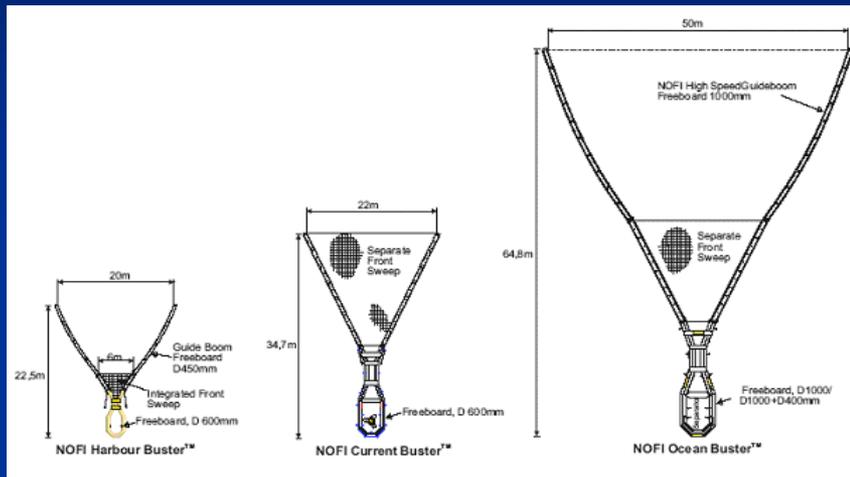
Aqua-guard Disk/Drum Skimmer



NOFI Current Busters



Harbor, Current, Ocean









Deployment Platforms



Airboats



Freighter Airboat



Landing Craft



Offshore Vessels



Conclusions



- Most tactics not proven in real spill situations
- Equipment has operational limitations
- Entrainment with shallow skirted boom
- Safety becomes a real issue in fast cold water
- Certain equipment has proven to be effective
- Logistics can be difficult
- Pre-planning and training is essential
- Tides, currents present challenges