UNIQUE CHALLENGES of BOOMING FAST FLOWING RIVERS

BOOM DEPLOYMENT TECHNIQUES & STRATEGIES

by

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WHEN ATTEMPTING to BOOM a FAST FLOWING RIVER

THERE are THREE (3) GIVENS:

- ***YOUR RADIOS GO DOWN,***
- ***YOUR BOATS WON'T START &***
- ***YOUR ANCHORS WON'T HOLD.***

ADDITIONALLY,
MOST SPILL RESPONSE TEAMS INITIALLY CONSIST of

- ***ME,***
- ***YOU,***
- **BUBBA**

A PICKUP TRUCK with LITTLE or NO EQUIPMENT and/or the INCORRECT TYPE of EQUIPMENT (BOOM) for RIVER APPLICATIONS.

OUR OBJECTIVE is to PROVIDE a DECISION PROCESS to AID the FIRST RESPONDER in the

PROPER SELECTION of APPROPRIATE SPILL RESPONSE STRATEGIES

for

BOOMING FAST FLOWING RIVERS

SPILL RESPONSE STRATEGIES

- *MONITOR, WAIT & DO NOTHING*
- *IN-SITU BURNING*
- *CHEMICAL TREATMENTS*
- *PHYSICAL CONTAINMENT of OIL*
- *PHYSICAL REMOVAL OF OIL*
- *SHORELINE/BANK CLEANUP*
- *WASTE DISPOSAL*
- *REMEDIATION & RESTORATION*

BOOM CONSIDERATIONS:

- ***WHAT is PRACTICAL?***
- ***HOW EFFICIENT?***
  (Effort vs Effectiveness)
- ***WHAT are the RESPONSE OPTIONS?***
  ("Environmental Damaging")
- ***WHAT are the IMPLICATIONS of MONITORING?***
  (Self Cleaning Response)
- ***ARE THERE POLITICAL or SOCIAL SENSITIVITY ISSUES?***
- ***HOW MUCH WASTE will be GENERATED or COLLECTED?***
  (i.e. Disposal)

SELECTION FACTORS

- *TYPE of WATER BODY*
- *CURRENT SPEED*
- *SHORELINE CONFIGURATION*
- *NATTURAL COLLECTION POINTS*
- *WATER DEPTH*
- *AVAILABLE EQUIPMENT*
- *AVAILABLE MANPOWER*
- *AMOUNT of OIL SPILLED*
- *WEATHER CONDITIONS*
- *TIME of YEAR*

"3" BOOM DEPLOYMENT STRATEGIES

- **EXCLUSION BOOMING**

  Deflection

- **CONTAINMENT BOOMING**

  Lakes/Bays/Ocean/Rivers

- **DIVERSION BOOMING**

  Single

  Cascade

  Chevron

- ***EXCLUSION BOOMING:***

Boom Deployment ACROSS or AROUND Sensitive Areas and Anchored in Place to "EXCLUDE" a Pollutant from Contaminating the Area.

Used Across:

SMALL BAYS,
HARBOR ENTRANCES,
INLETS,
RIVERS,
CREEK/STREAM MOUTHS,
WATER INTAKE SYSTEMS, ETC.

to PROTECT an AREA and/or PREVENT BEING OILED.

Exclusion Booming of Confluence of Rivers

Nonconnah Creek - Memphis, Tennessee Area

- ***DEFLECTION BOOMING:***

Boom is Deployed from the shoreline away from the Approaching Pollutant and Anchored in Place.

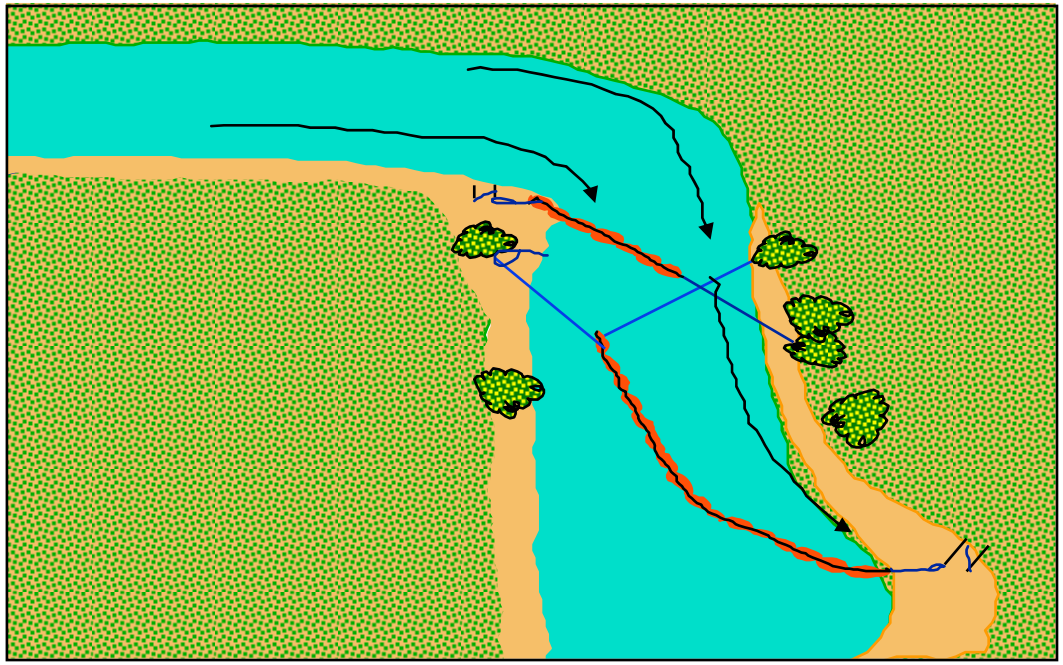
The Pollutant is Deflected away from the River Bank &/or Shoreline

The Pollutant is "Deflected and/or Pushed Away" from a Sensitive Area and/or Prevented from Impacting the Area in Question.

The Approaching Slick is Forced into a Taking a New Direction.

Used on: ***RIVERS,***
STREAMS & CREEKS,
HARBOR ENTRANCES,
INLETS,
BAYS.

Deflection Boom Deployment



Deflection Booming - River Deployment

Weber River - Coalville, Utah Area

- ***CONTAINMENT BOOMING:***

  In Lake, Bay, or Ocean Response, Boom is Deployed in a " U" or " V " Shape in Front of the Approaching Oil Slick.

  Boom Towing Bridles are Anchored &/or Secured to the Work Boat with 100 Ft. Tow Lines or Directly to the Shoreline/Bank.

  On Rivers, the Oil is diverted to the Shoreline/River Bank for Containment and Recovery.

Containment Booming - River Bank

Marias River - Shelby, Montana Area

TYPES of DIVERSION BOOMING

- ***SINGLE DIVERSION,***
- ***CASCADE DIVERSION,***

  BANK to BANK ROPE SYSTEM

  BRIDGE to BANK ROPE SYSTEM

  BUOY to BANK ROPE SYSTEM

- ***CHEVRON DIVERSION***

  CLOSED CHRVRON SYSTEM

  OPEN CHEVRON SYSTEM

  CASCADE CHEVRON SYSTEM

- ***DIVERSION BOOMING:***

Boom is DEPLOYED at an ANGLE to the Approaching Pollutant.

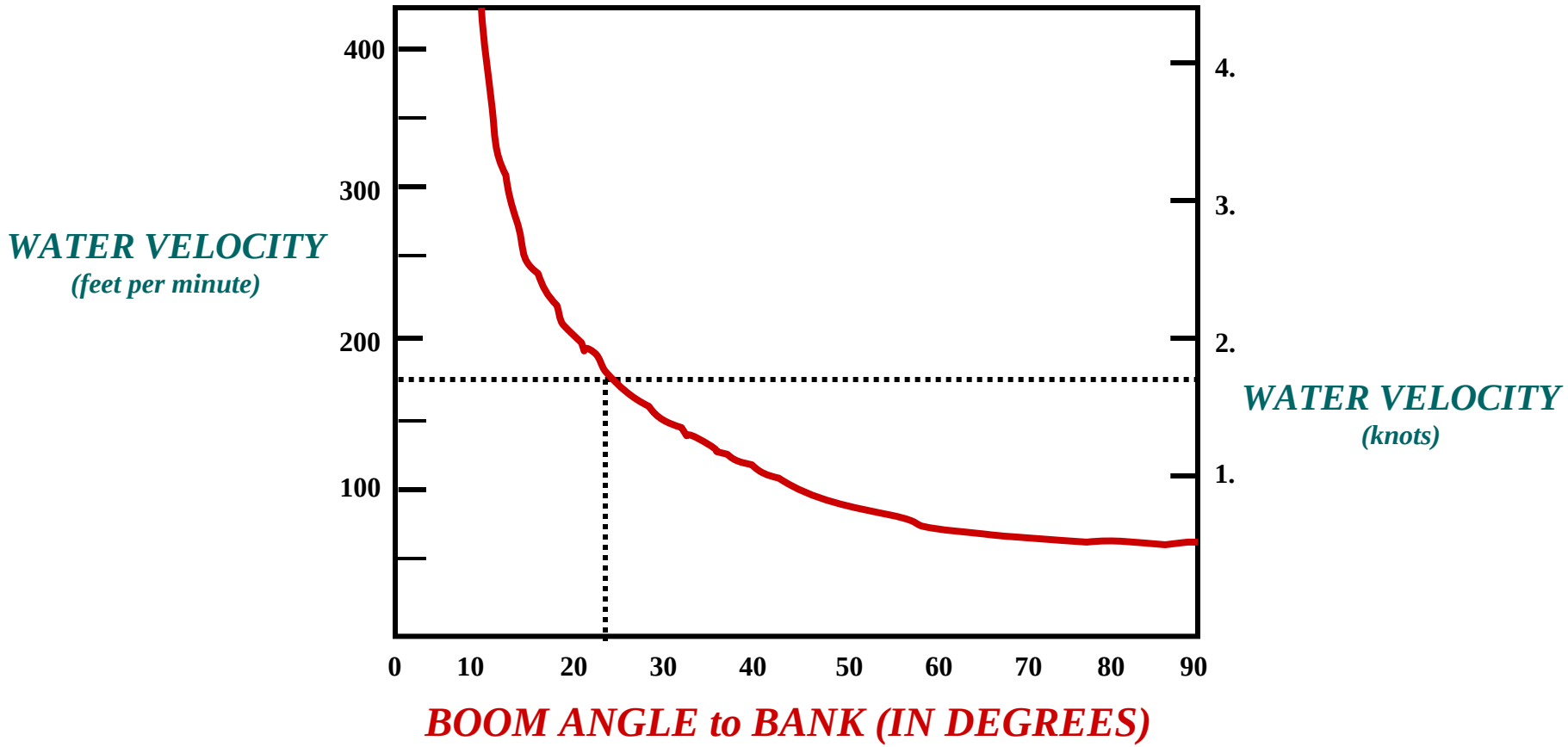
The FASTER the Current, the SMALLER the BOOM ANGLE of DEPLOYMENT into the FLOWING WATER.

The Pollutant is Either " DEFLECTED " away from a from a Sensitive Area or " DIVERTED " to a Central Collection Point on the River Bank to Ease Recovery.

Used on: ***RIVERS,***
STREAMS & CREEKS,
HARBOR ENTRANCES,
INLETS,
BAYS

where Currents Exceed 1 KNOTS &/or 1.15 MILES PER HOURS.

BOOM ANGLES for VARIOUS CURRENT SPEEDS



Plot of the Maximum Angle for Boom Deployment at Increasing Current Velocities.

Single Diversion Boom Deployment with Shoreline Protection

Red River of the North - Fargo, North Dakota

FAST RIVER BOOMING TECHNIQUES

" ROPE " CASCADE DIVERSION BOOM DEPLOYMENT SYSTEMS

- ***BANK to BANK ROPE SYSTEM***
- ***BRIDGE to BANK ROPE SYSTEM***
- ***BUOY to BANK ROPE SYSTEM***

Bank to Bank Rope Anchor System

Blackstone River - Pawtucket, Rhode Island Area

Bank to Bank Rope Anchor System

Spokane River - Spokane, Washington Area

FAST RIVER BOOMING TECHNIQUES

BANK to BANK ROPE SYSTEM

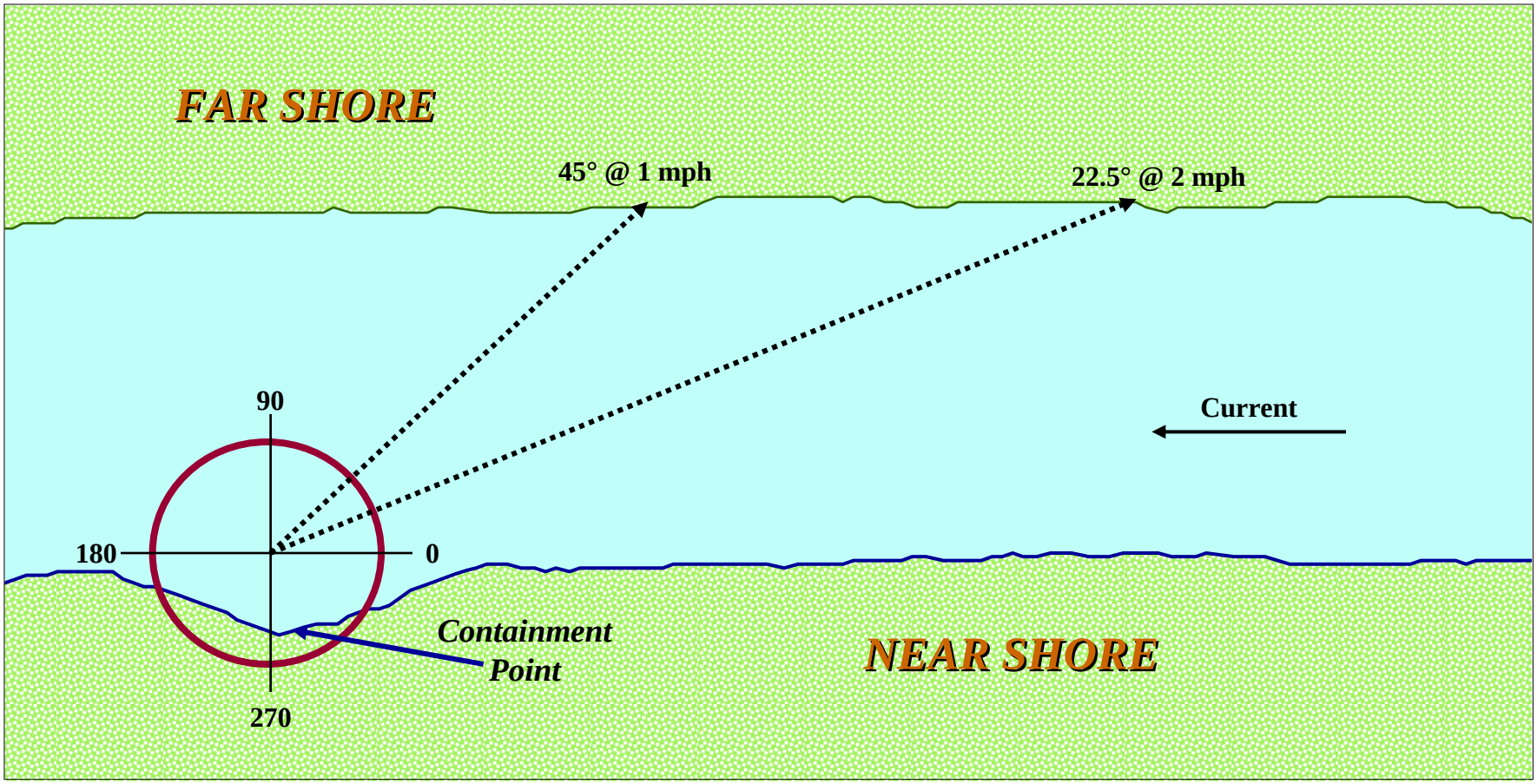
HOW DO WE BEGIN PROCESS of BOOMING the RIVER?

ANSWER:

DIVIDE OIL SPILL RESPONSE GROUP into 3 SPILL RESPONSE TEAMS.

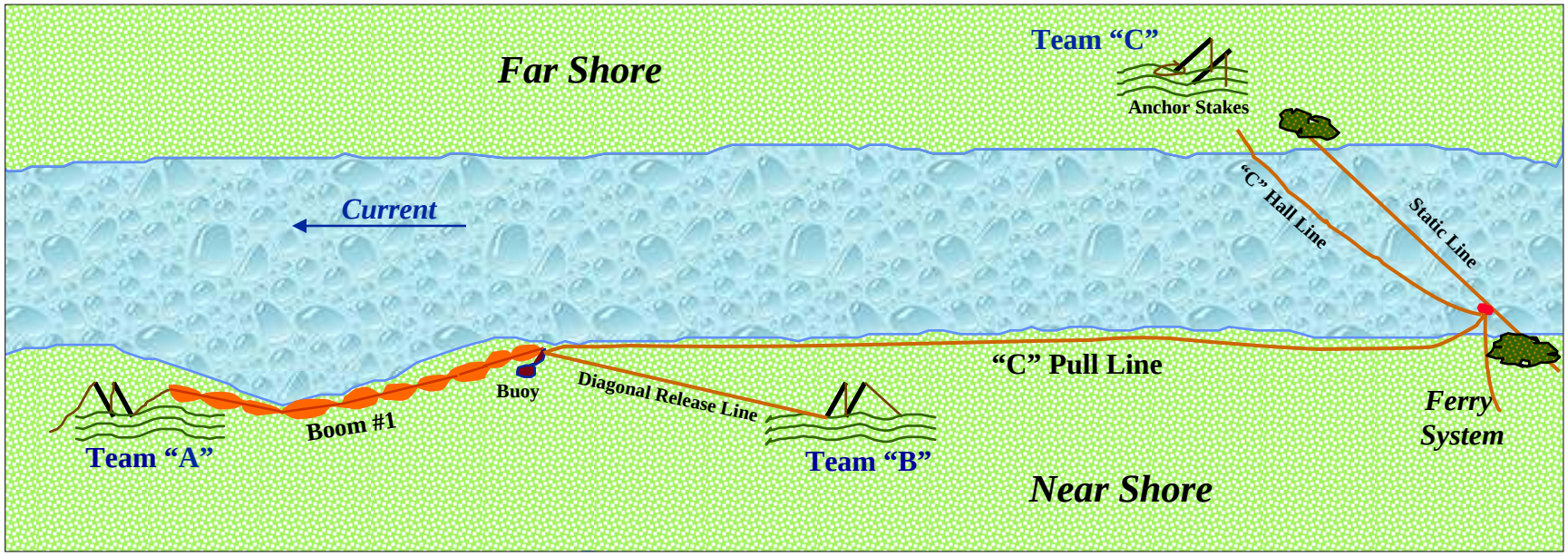
- ***TEAM "A"***
- ***TEAM "B"***
- ***TEAM "C"***

DETERMINING ANGLE to DEPLOY BOOM in FAST FLOWING RIVERS



Fast River Boom Deployment

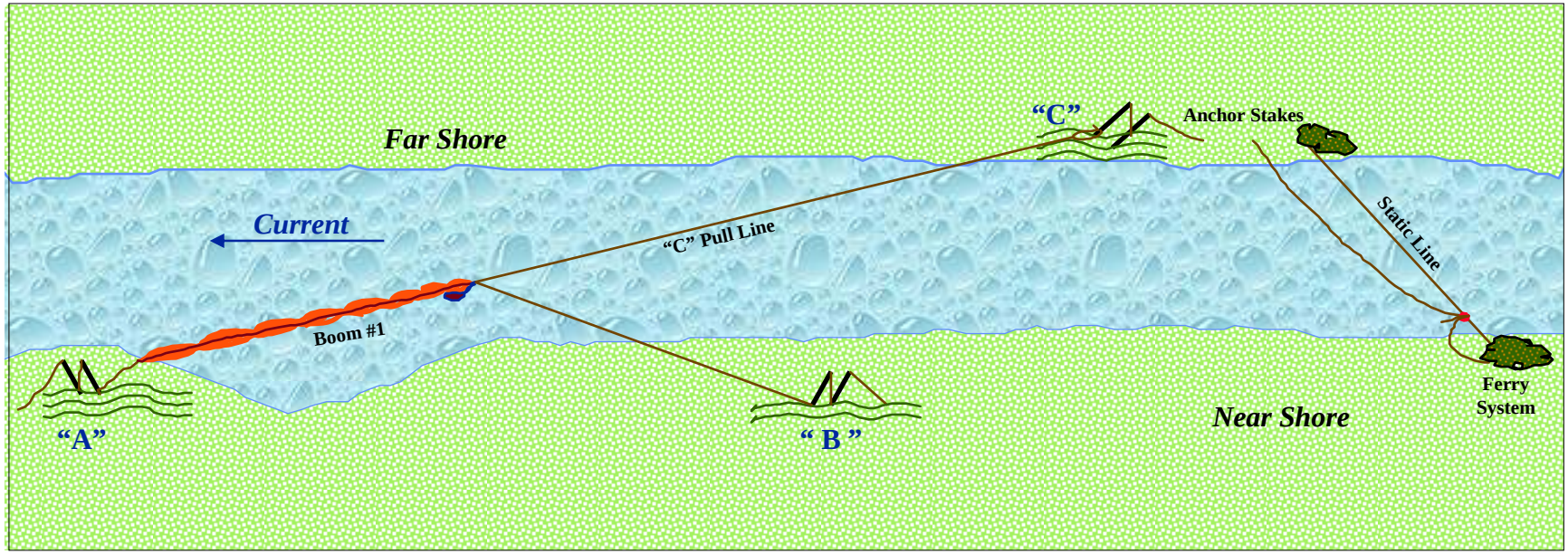
Step 1.



Bank to Bank Rope Anchor System

Fast River Boom Deployment

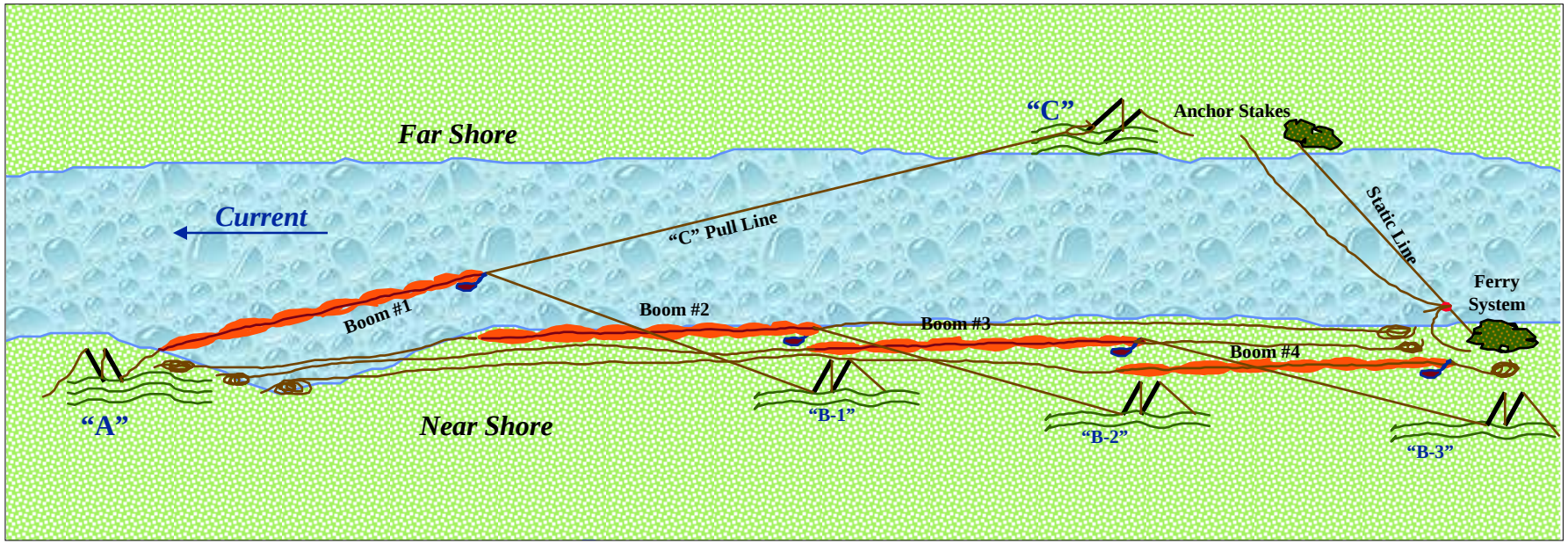
Step 2.



Bank to Bank Rope Anchor System

Fast River Boom Deployment

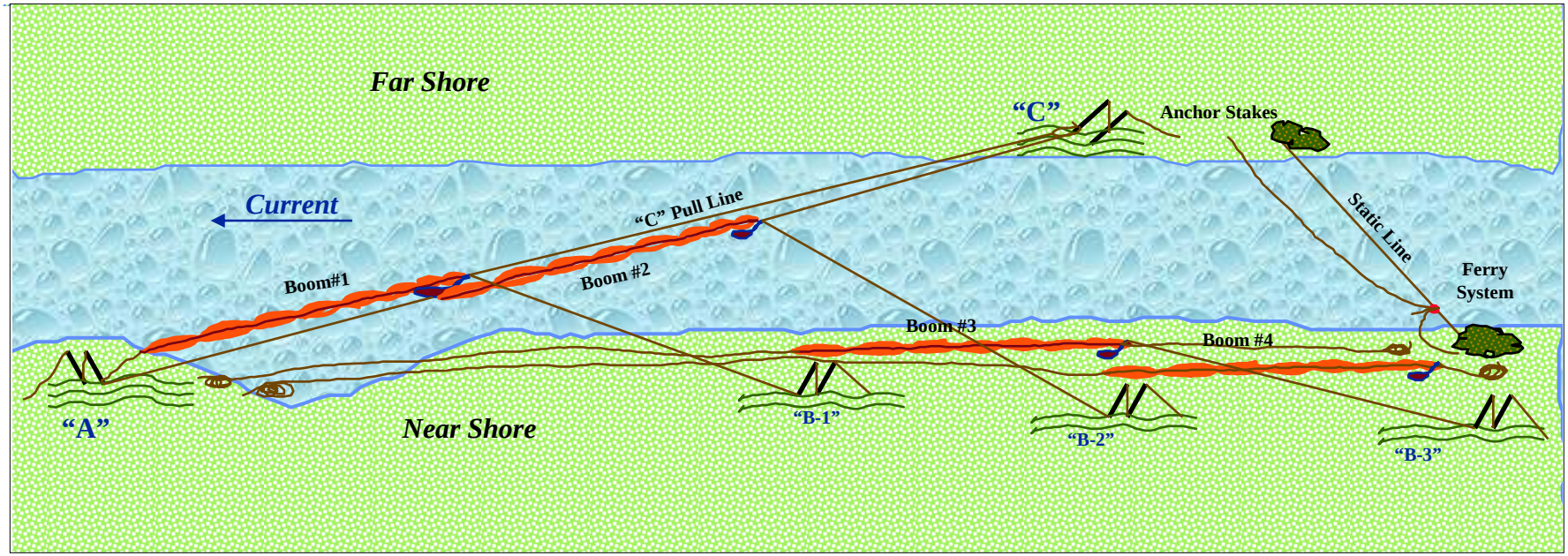
Step 3.



Bank to Bank Rope Anchor System

Fast River Boom Deployment

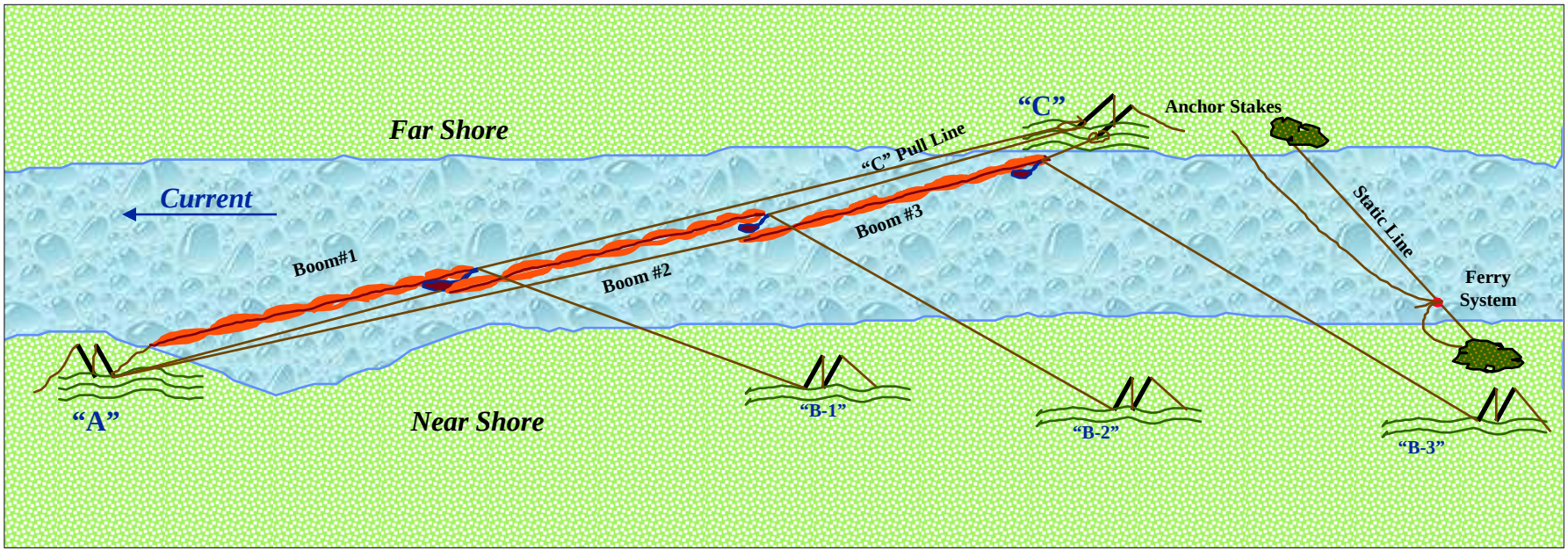
Step 4.



Bank to Bank Rope Anchor System

Fast River Boom Deployment

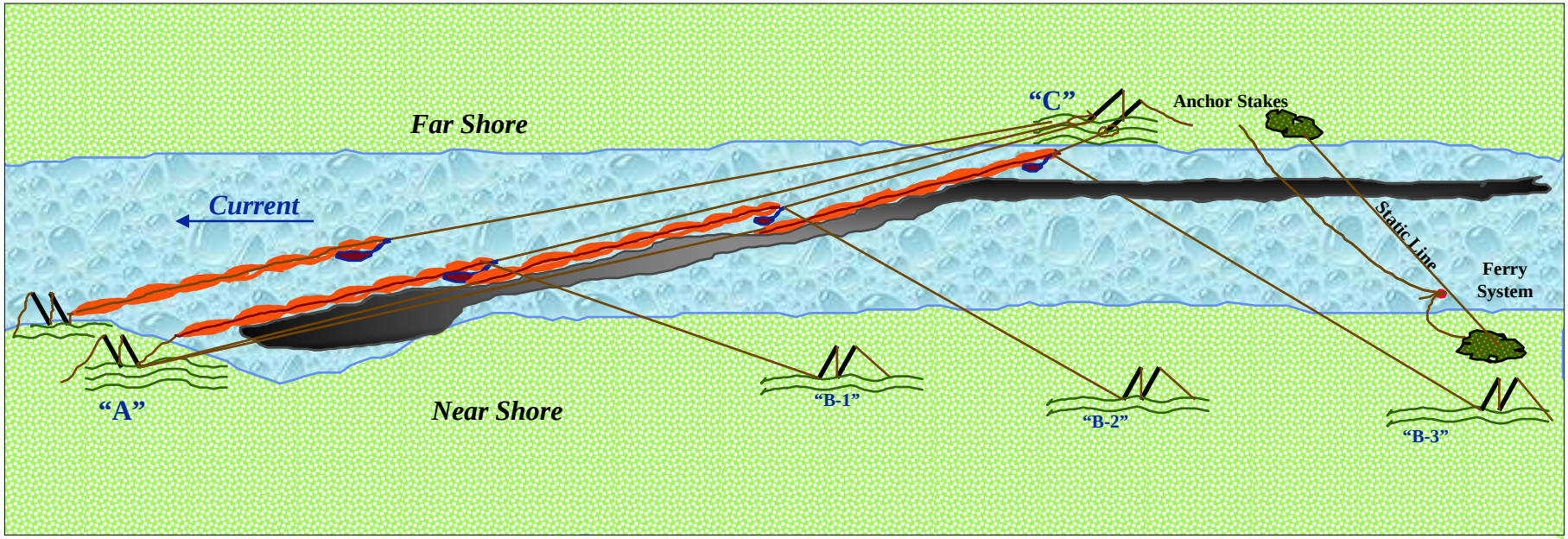
Step 5.



Bank to Bank Rope Anchor System

Fast River Boom Deployment

Step 6.



Bank to Bank Rope Anchor System

***Bank to Bank Rope Anchor System* - Bank Layout**

American River - Sacramento, California

No. 1 - Boom Being Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

No. 2 - Boom Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

No. 3 - Boom Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

No. 4 - Boom Being Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

No. 4 - Boom Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

No. 5 - Boom Deployed - Bank to Bank Rope Anchor System

No. 6 - Boom Deployed - Bank to Bank Rope Anchor System

American River - Sacramento, California

Bank to Bank Rope Anchor System

North Platte River - Guernsey, Wyoming

Bank to Bank Rope Anchor System

Rio Grande - Taos, New Mexico

Bank to Bank Rope Anchor System

Boise River - Boise, Idaho Area

Bank to Bank Rope Anchor System

San Juan River - Shiprock, New Mexico Area

Bank to Bank Rope Anchor System

Yellowstone River - Billings, Montana Area

Bank to Bank Rope Anchor System

Platte River - Casper, Wyoming Area

Bank to Bank Rope Anchor System

Stillwater River - Fitchburg, Massachusetts Area

Bank to Bank Rope Anchor System

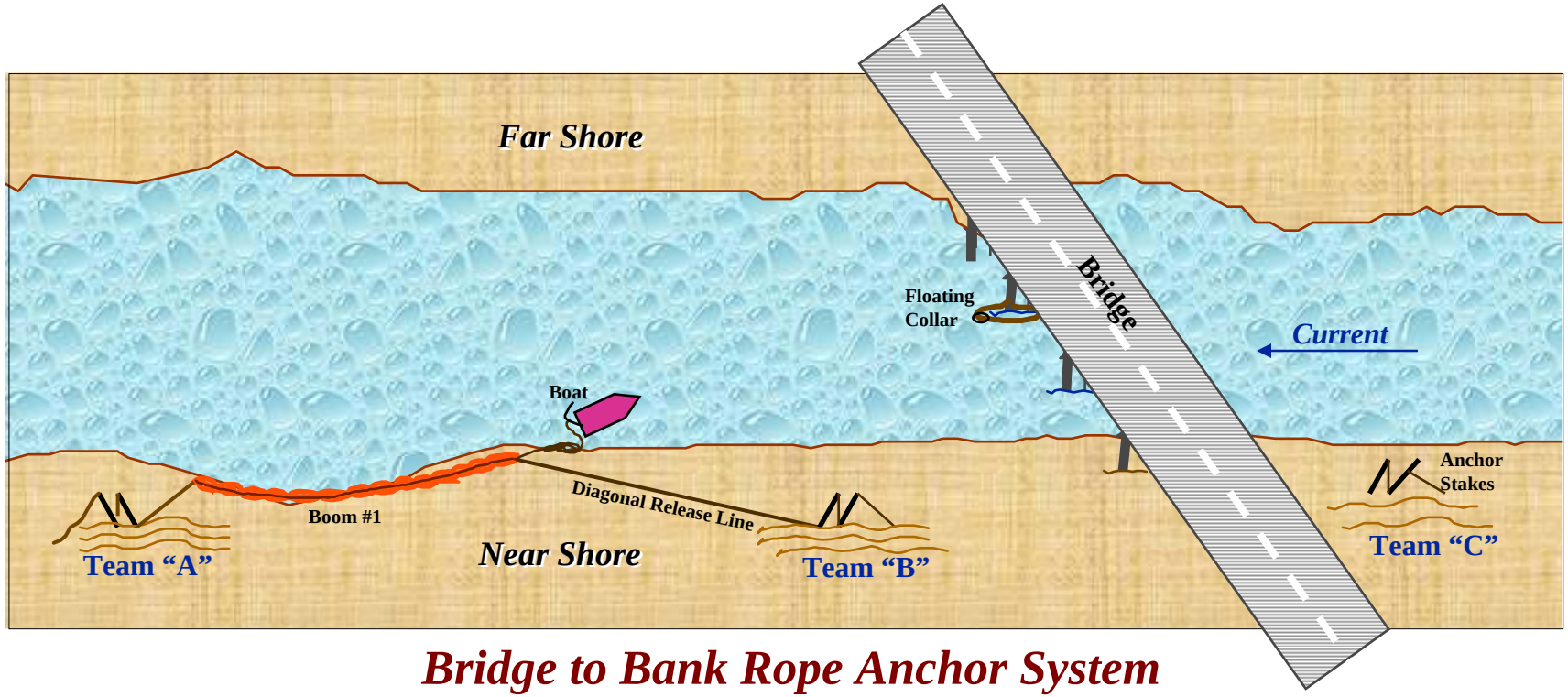
Truckee River - Truckee, Nevada Area

FAST RIVER BOOMING TECHNIQUES

BRIDGE to BANK ROPE SYSTEM

Fast River Boom Deployment

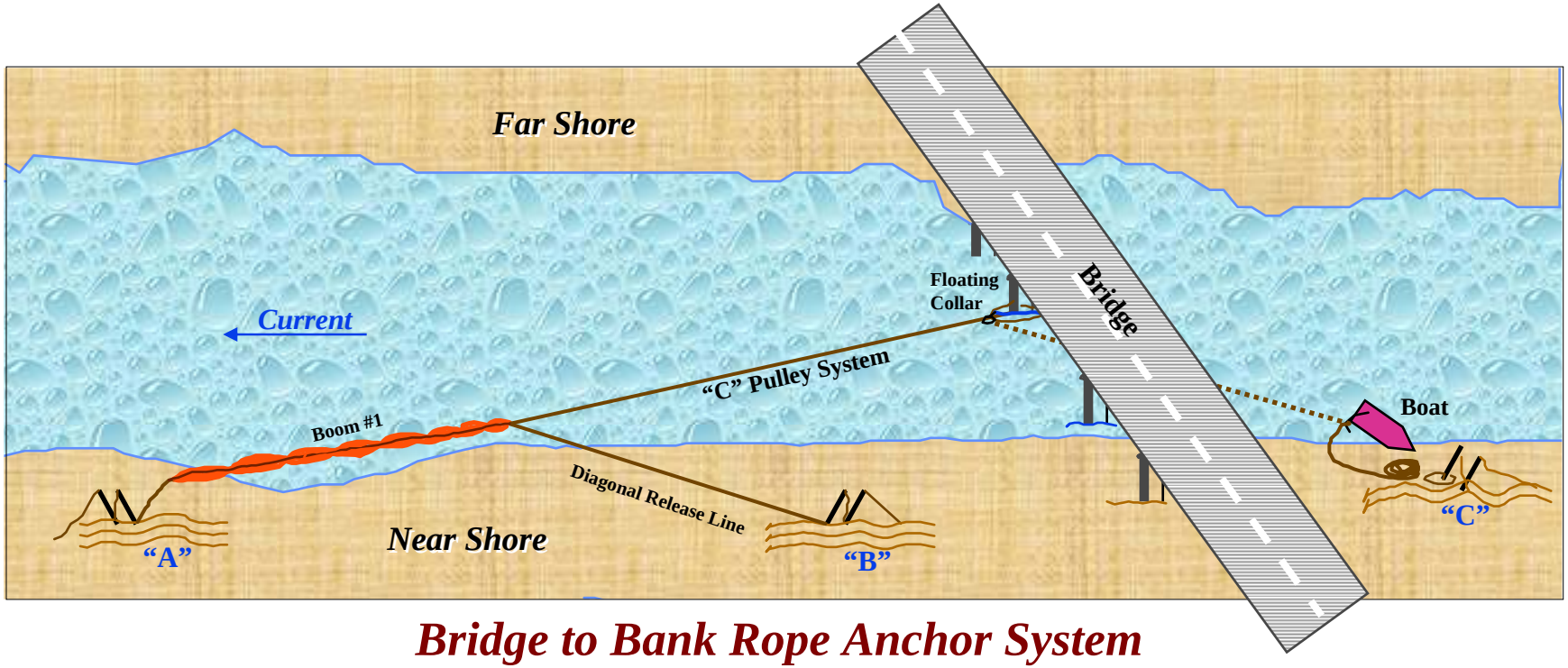
Step 1.



Bridge to Bank Rope Anchor System

Fast River Boom Deployment

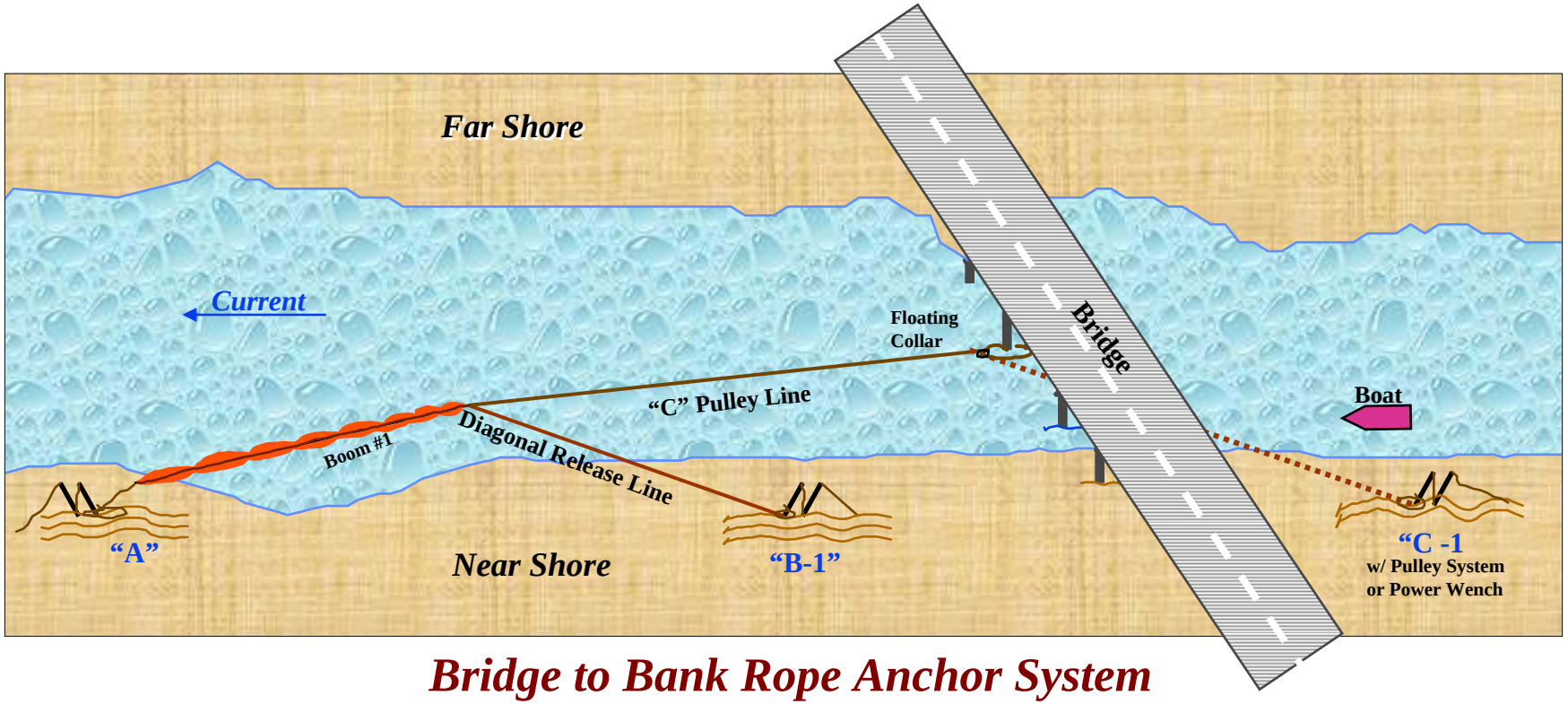
Step 2.



Bridge to Bank Rope Anchor System

Fast Water Booming Technique

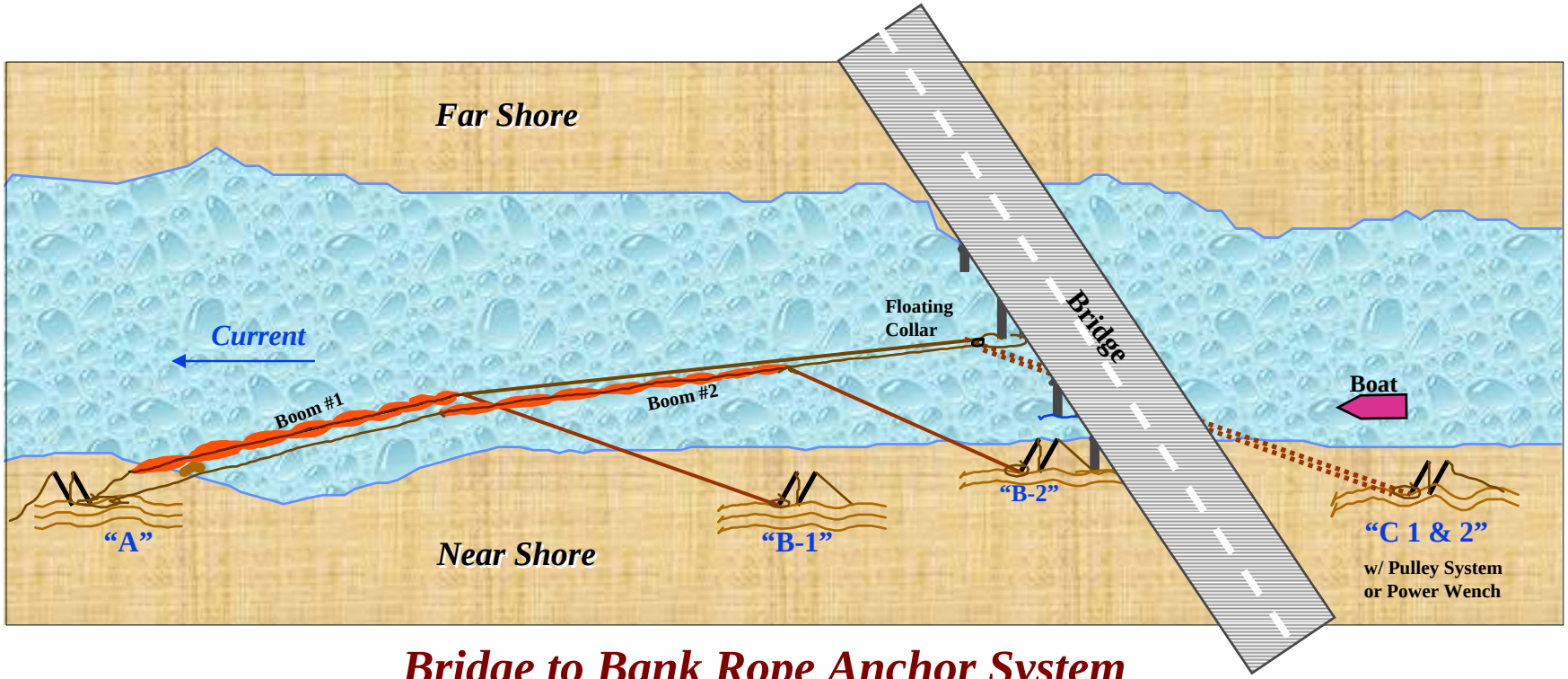
Step 3.



Bridge to Bank Rope Anchor System

Fast River Boom Deployment

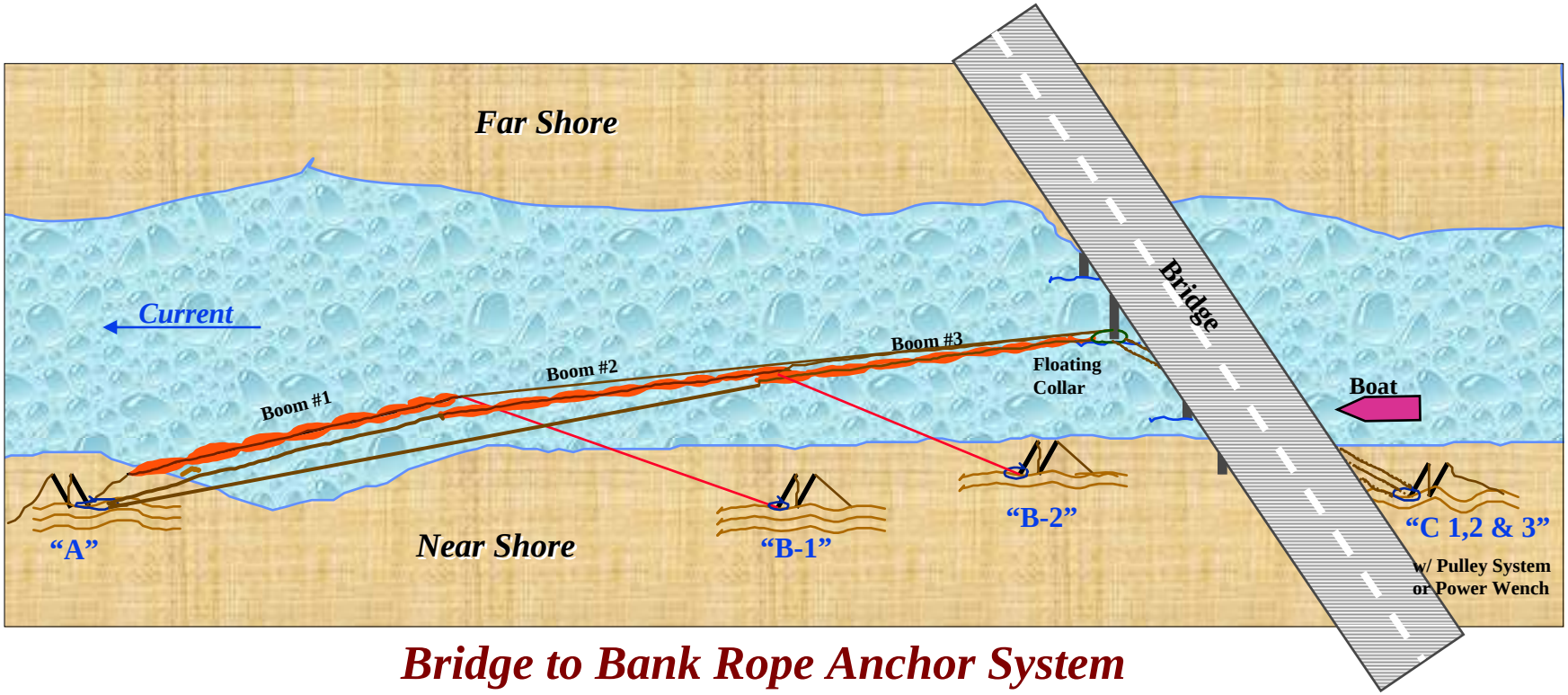
Step 4.



Bridge to Bank Rope Anchor System

Fast River Boom Deployment

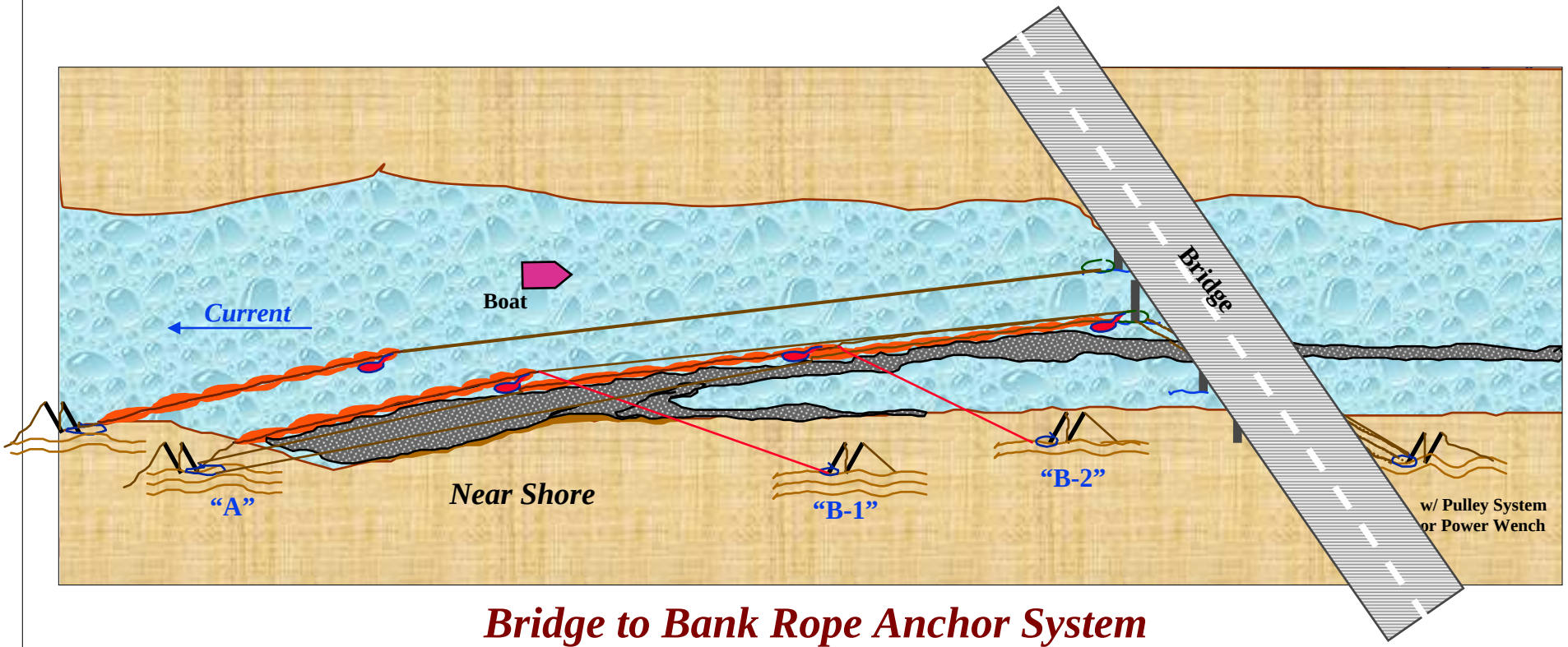
Step 5.



Bridge to Bank Rope Anchor System

Fast River Boom Deployment

Step 6.



Bridge to Bank Rope Anchor System

Bridge to Bank Rope Anchor System

Colorado River - Bullhead City, Arizona Area

Bridge to Bank Rope Anchor System

Rope Lead Anchor Collar Around Bridge Column

Colorado River - Bullhead City, Arizona Area

Rope Being Pulled by Power Winch with Side Capstan Mounted on Stand

Colorado River - Bullhead City, Arizona Area

Bridge to Bank Rope Anchor System

Colorado River - Blythe, California Area

Bridge to Bank Rope Anchor System - Boat & Rope Handling

Colorado River - Blythe, California Area

Bridge to Bank Rope Anchor System

Power Wench with Rope Lead thru "D" Ring located on Bridge Column

Colorado River - Blythe, California Area

Bridge to Bank Rope Anchor System

View of Boom Containment & Recovery Site

Colorado River - Blythe, California Area

Bridge to Bank Rope Anchor System

Nonconnah Creek - Memphis, Tennessee Area

Bridge to Bank Rope Anchor System - View of Bridge Rope Anchoring

Weber River - Coalville, Utah Area

Bridge to Bank Rope Anchor System

Open Chevron Cascade Boom Deployment with Deflection

Weber River - Coalville, Utah Area

Bridge to Bank Rope Anchor System

St. Johns River - Mayport, Florida Area

Bridge to Bank Rope Anchor System

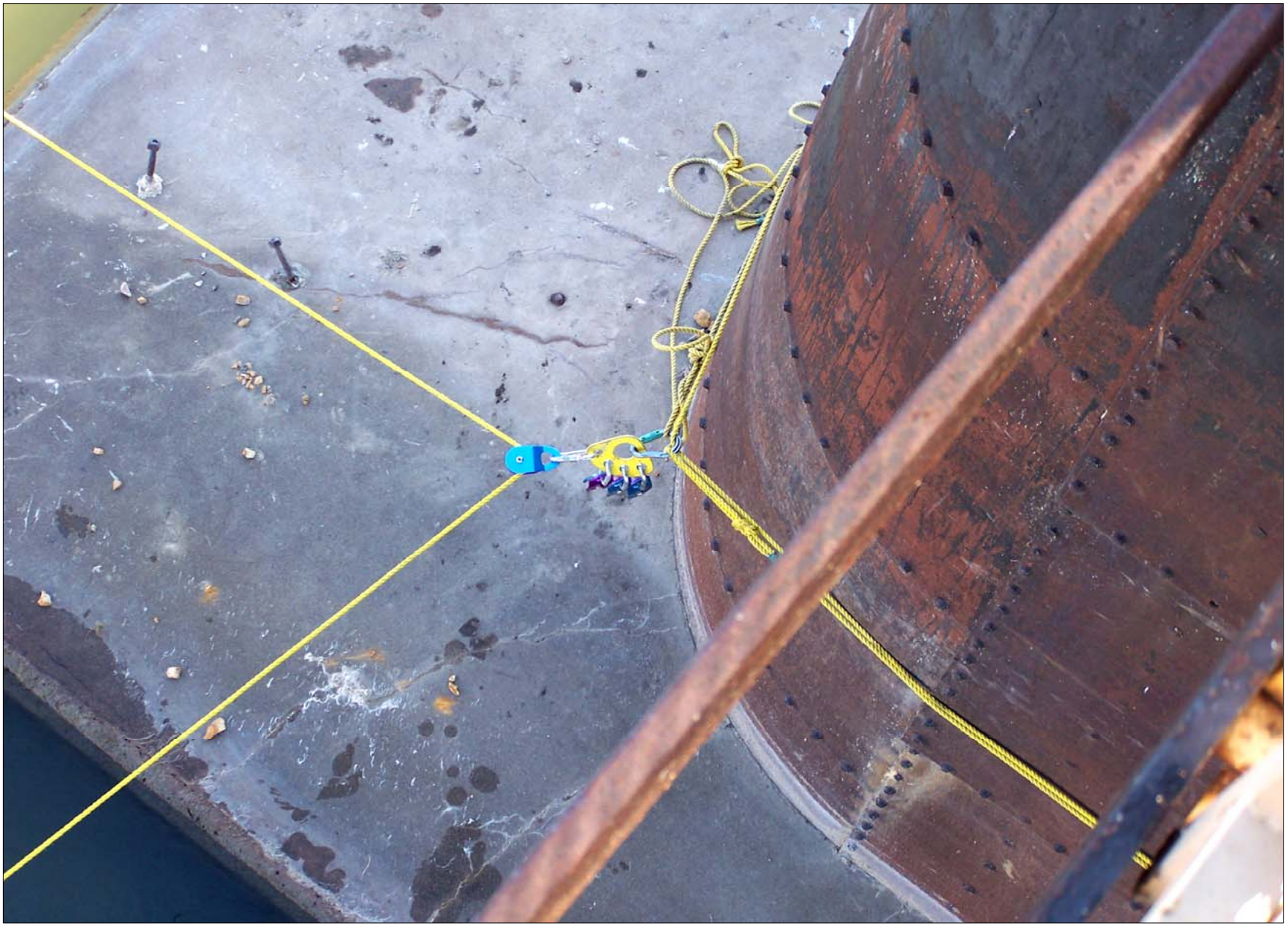
St. Johns River - Mayport, Florida Area

Bridge to Bank Rope Anchor System

St. Johns River - Mayport, Florida Area

Bridge to Bank Rope Anchor System - Bridge Column

Missouri River - Fort Benton, Montana

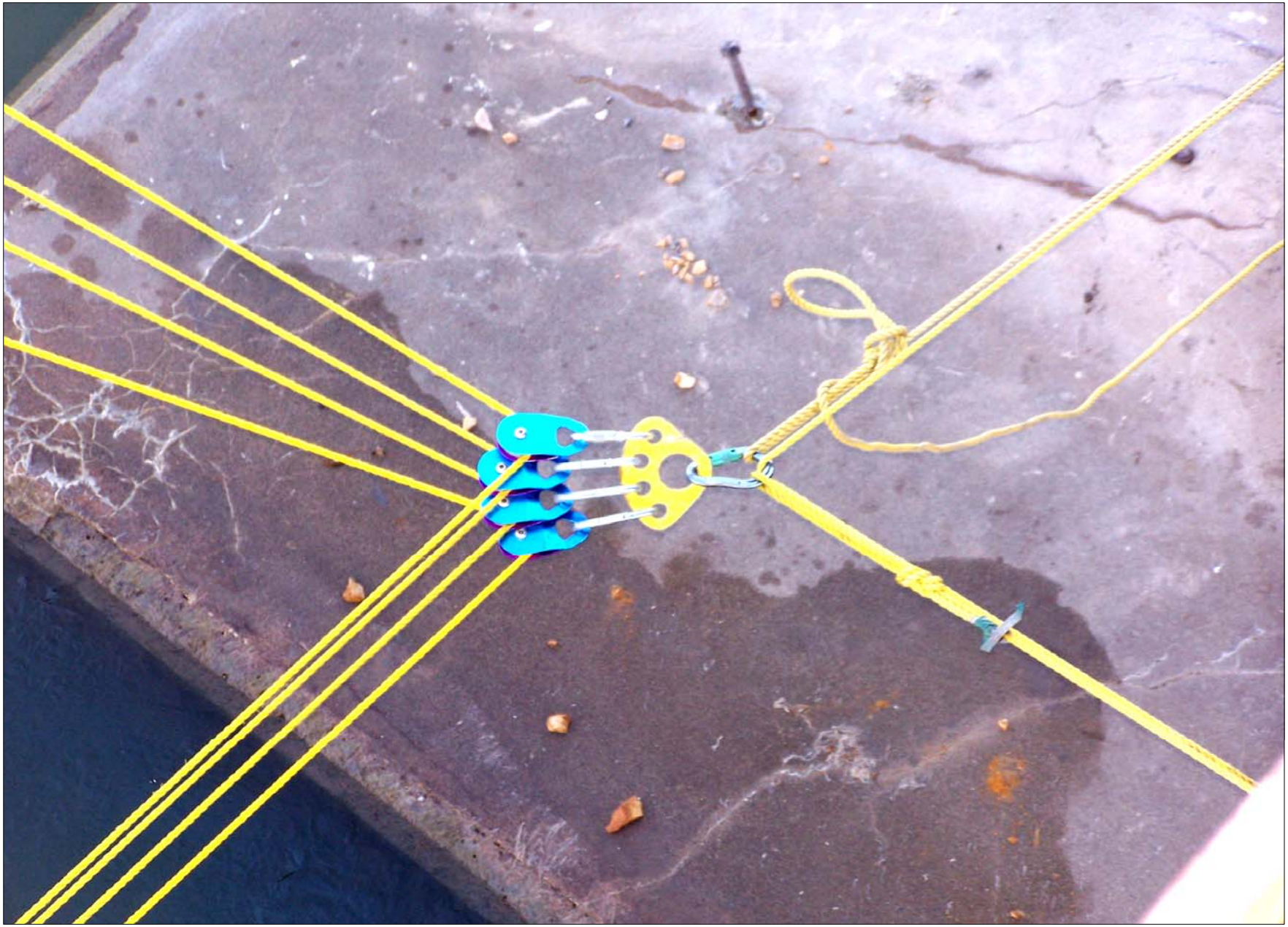


Bridge to Bank Rope Anchor System - Bridge Column

Missouri River - Fort Benton, Montana

Bridge to Bank Rope Anchor System - Bridge Column to Bank Anchor

Missouri River - Fort Benton, Montana



Bridge to Bank Rope Anchor System - Bridge Column

Missouri River - Fort Benton, Montana

Bridge to Bank Rope Anchor System - Bridge Column

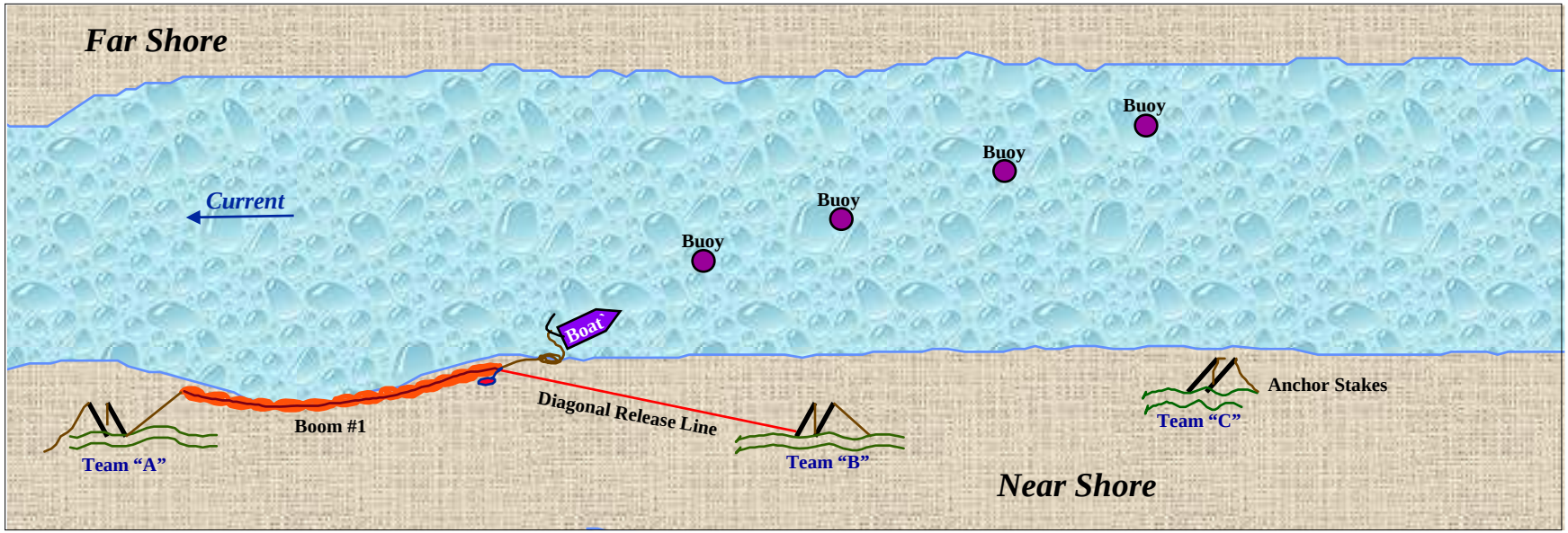
Missouri River - Fort Benton, Montana

FAST RIVER BOOMING TECHNIQUES

BUOY to BANK ROPE SYSTEM

Fast River Boom Deployment

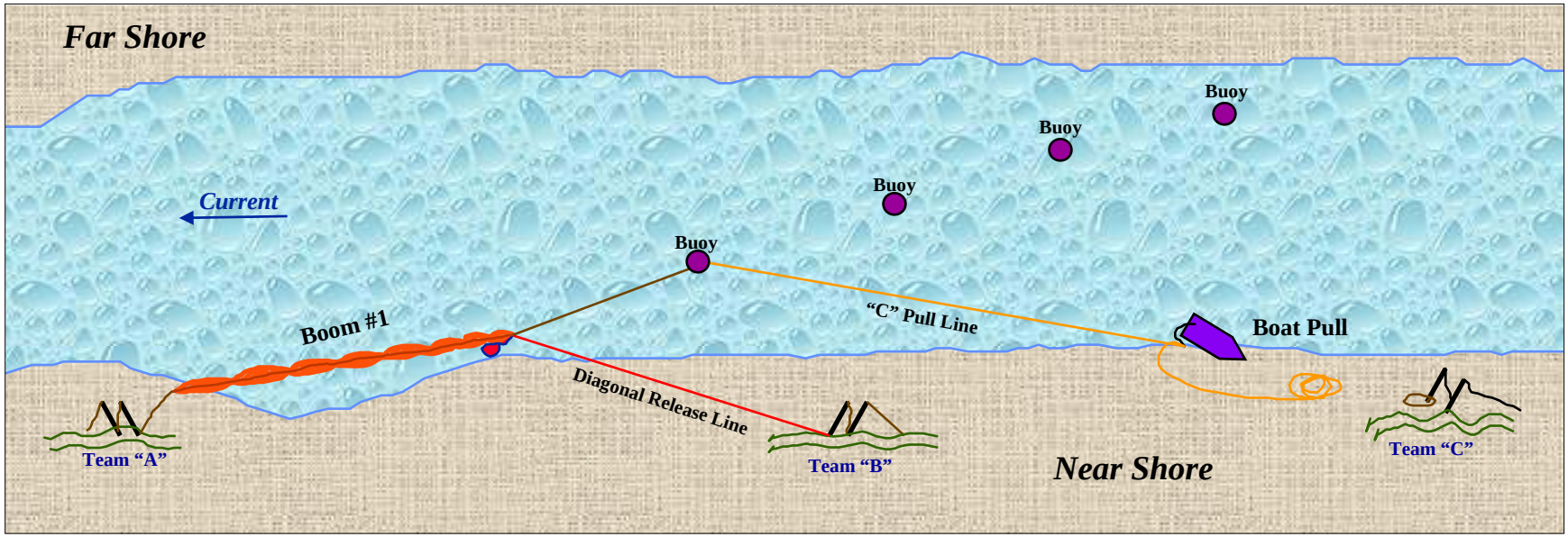
Step 1.



Buoy to Bank Rope Anchor System

Fast River Boom Deployment

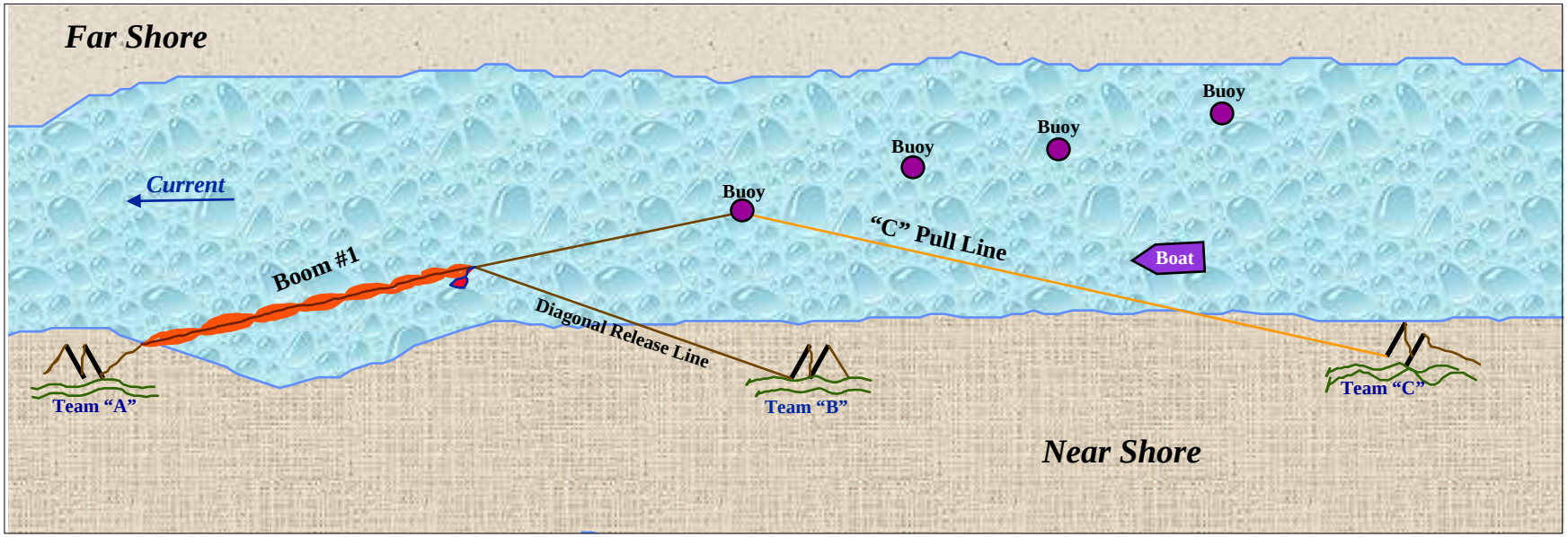
Step 2.



Buoy to Bank Rope Anchor System

Fast River Boom Deployment

Step 3.

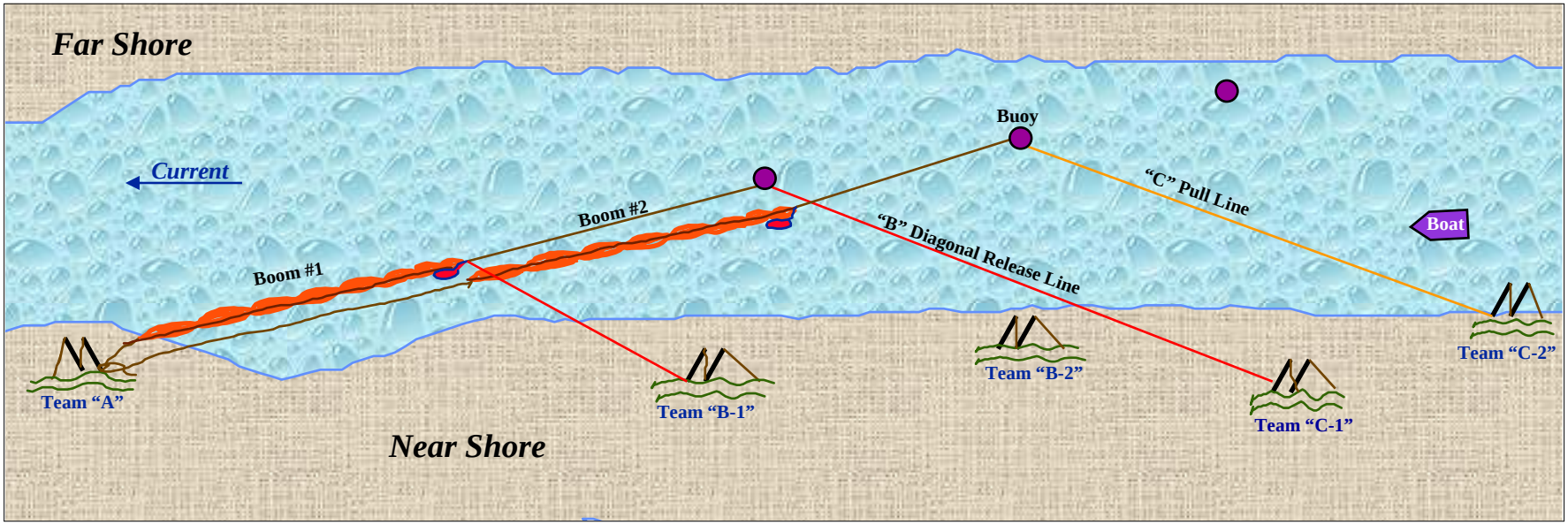


Buoy to Bank Rope Anchor System

(Repeat Process for Each Boom Section)

Fast River Boom Deployment

Step 4.

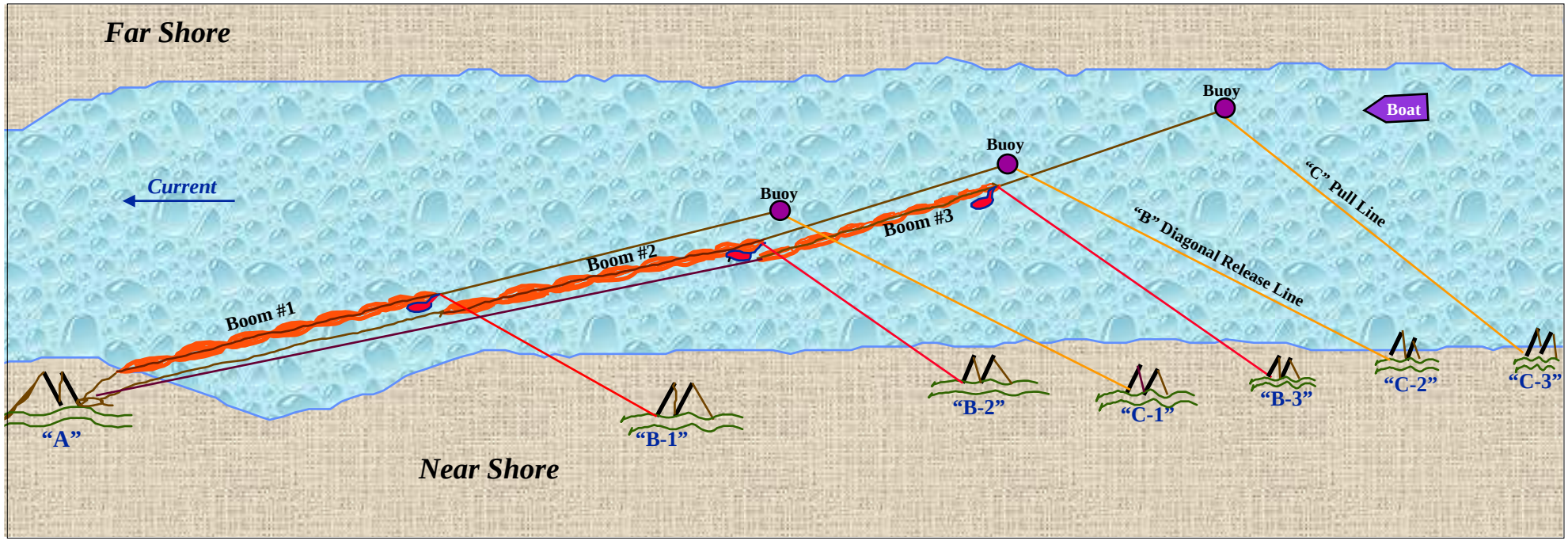


Buoy to Bank Rope Anchor System

(Repeat Process for Each Boom Section)

Fast River Boom Deployment

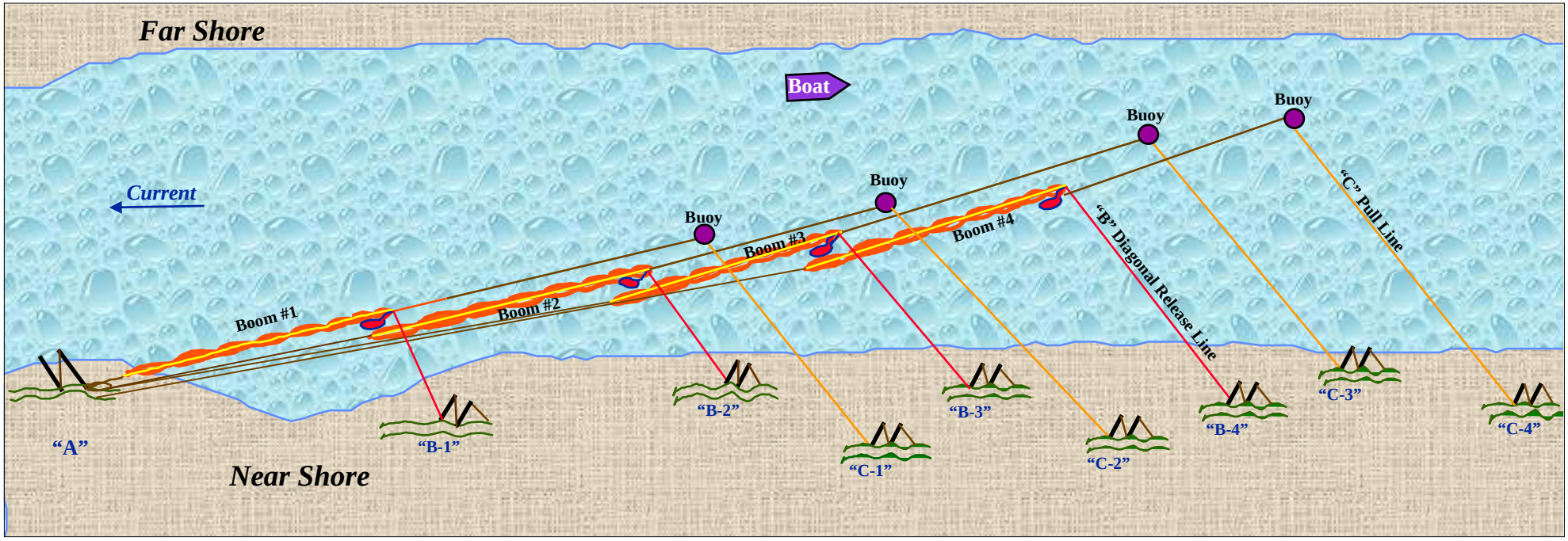
Step 5.



Buoy to Bank Rope Anchor System

Fast River Boom Deployment

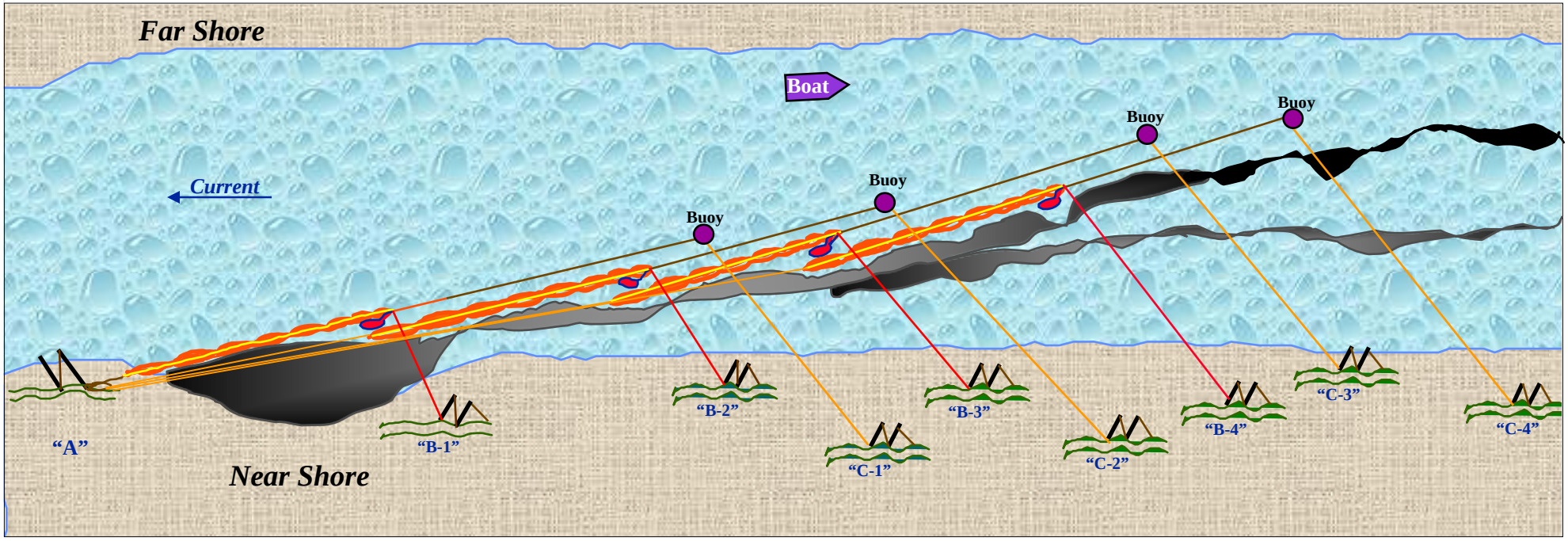
Step 6.



Buoy to Bank Rope Anchor System

Fast River Boom Deployment

Step 7.



Buoy to Bank Rope Anchor System

Buoy to Bank Rope Anchor System - Boom Layout on Bank

Colorado River - Page, Arizona Area

Buoy to Bank Rope Anchor System - Permanent Anchor Placement

Colorado River - Page, Arizona

Buoy to Bank Rope Anchor System - Permanent Anchor Placement

Colorado River - Page, Arizona

Buoy to Bank Anchor System

USCG Buoy Tender in Position to Drop 1600 lb. Sinker with Buoy

Missouri River - St. Louis, Missouri Area

Buoy to Bank Anchor System

USCG Buoy Tender in Position to Drop 1600 lb. Sinker with Buoy

Missouri River - St. Louis, Missouri Area

Buoy to Bank Rope Anchor System

Mississippi River - St. Louis, Missouri Area

BOOM CONSIDERATIONS:

- ***WHAT IS PRACTICAL?***
- ***HOW EFFICIENT?***

(Effort vs Effectiveness)

- ***WHAT are the RESPONSE OPTIONS?***

("Environmental Damaging")

- ***WHAT are the IMPLICATIONS of MONITORING?***

(Self Cleaning Response)

- ***ARE THERE POLITICAL or SOCIAL SENSITIVITY ISSUES?***
- ***HOW MUCH WASTE will be GENERATED or COLLECTED?***

(i.e. Disposal)

The RESPONSE STRATEGY that is SELECTED WILL DEPEND on the FOLLOWING FACTORS:

- *TYPE of WATER BODY*
- *CURRENT SPEED*
- *SHORELINE CONFIGURATION*
- *NATTURAL COLLECTION POINTS*
- *WATER DEPTH*
- *AVAILABLE EQUIPMENT*
- *AVAILABLE MANPOWER*
- *AMOUNT of OIL SPILLED*
- *WEATHER CONDITIONS*
- *TIME of YEAR*

In SUMMARY -
HOW to DEPLOY BOOM in FAST FLOWING RIVERS

• If the RIVER LOOKS FAST - then CONSIDER IT'S FAST.

• USE BOOM ANGLE CHART -
If in DOUBT ESTABLISH a 20-25 DEGREE POINT into the RIVER CURRENT to ESTABLISH BOOM DEPLOYMENT & ANCHORING POINTS.

A GIVEN - "The FASTER the RIVER CURRENT"

- *The SMALLER the ANGLE into the RIVER CURRENT to DETERMINE BOOM DEPLOYMENT ANGLE & ANCHOR POINT on the FAR SHORE*

- *The SMALLER the BOOM SIZE that SHOULD be DEPLOYED*
(10" and/or 12" is the Maximum Size)

- *& the SHORTER the BOOM LENGTH SECTION that SHOULD be DEPLOYED*
(Generally 50' to 100' Sections)

DON'T LET THIS BE YOUR BOOM DEPLOYMENT