

CAL POLY POMONA GEOMATICS CONFERENCE 2016

Water Boundaries Presentation

October 07, 2016

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INTRODUCTION

- “What are boundaries is a matter of law; where they are is a matter of fact” – Justice Wheeler, Texas Supreme Court, 1856
- Today’s goal: To give the attendees a very general overview of some considerations when water boundaries are encountered.

OUTLINE

- Some Basics
 - Some History
 - Some Terminology
- Water Boundaries – From **BIG** to LITTLE – the “Rules”
- Tides
- Navigability
- When the “Rules” change
- Laws, Legal References, Resources

VERY BRIEF HISTORY

- 1542 – California under Spanish dominion
- 1775 – USA was “born”, jurisprudence evolved from English common law
- 1820’s – California under Mexican dominion
- 1846-1848 – Mexican-American War
- 1848 – February 2, Treaty of Guadalupe Hidalgo – respect of former sovereign
- 1850 – September 9, California admitted to Union on equal footing doctrine

WATER BOUNDARY TERMINOLOGY

- general water boundary classifications
- tides and datums terms
- tidal
- non-tidal
- physical characteristics and changes
- navigability
- title
- measure
- miscellaneous

WATER BOUNDARY TERMINOLOGY

GENERAL TERMS

- lacustrine
- riparian
- littoral

WATER BOUNDARY TERMINOLOGY

TIDES AND DATUM TERMS

- national tidal datum epoch (NTDE)
- metonic cycle
- diurnal
- semi-diurnal
- mixed tides
- neap tides
- spring tides

WATER BOUNDARY TERMINOLOGY

TIDAL DATUM TERMS

- tidal datum
- MHHW – mean higher high water
- MHW – (~OHW ~MHT) mean high water
- MTL – mean tide level
- MSL – mean sea level
- MLW – mean low water
- MLLW – mean lower low water

WATER BOUNDARY TERMINOLOGY

TIDAL LAND TERMS

- tidelands
- submerged lands
- uplands
- littoral lands
- bight of land
- headlands

WATER BOUNDARY TERMINOLOGY

NON-TIDAL TERMS

- alluvion (can also be a tidal term)
- swamp
- marsh
- overflowed lands
- thread
- thalweg
- median line
- medium filum aquae

WATER BOUNDARY TERMINOLOGY

PHYSICAL CHARACTERISTICS & CHANGES

- natural
- artificial
- sudden
- imperceptible
- loss
 - avulsion
 - erosion
 - submergence
- gain
 - accretion
 - reliction
 - construction

WATER BOUNDARY TERMINOLOGY

NAVIGABILITY TERMS

- navigable waters
 - at law
 - in fact

WATER BOUNDARY TERMINOLOGY

TITLE TERMS

- other sovereign recognition
- public trust doctrine
- public trust lands
 - held by local government
 - held by private parties

WATER BOUNDARY TERMINOLOGY MEASUREMENTS

- geographic mile
- nautical mile
- statute mile
- league
- fathom

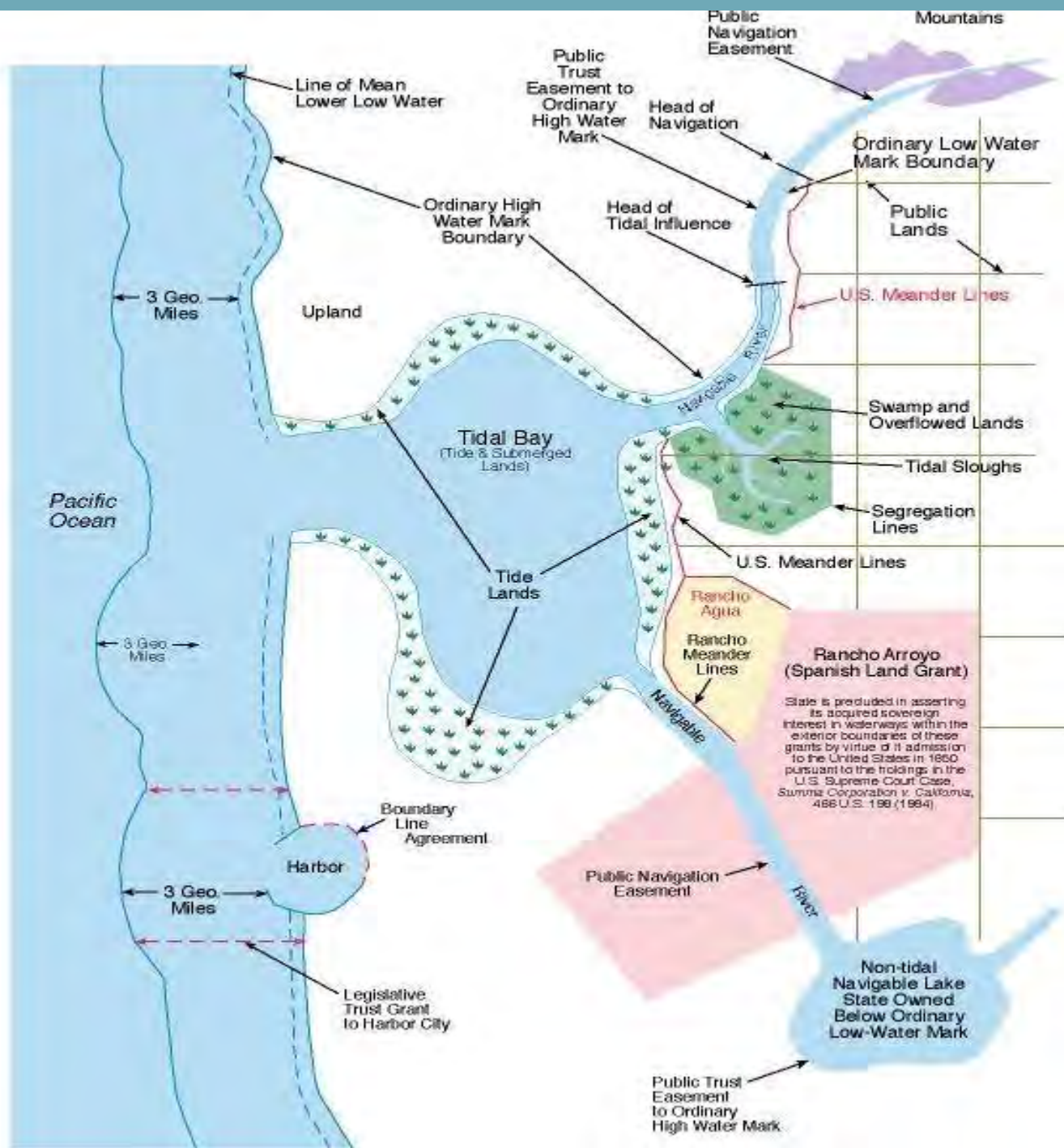
Water Boundaries – From BIG to Little

- International & Sovereign Boundaries
- Federal (US) & State Boundaries
- State & Upland Owner Boundaries
- Private Water Boundaries
- Unusual Situations – Islands
- Unusual Situations – S&O Lands

Water Boundaries – From BIG to Little

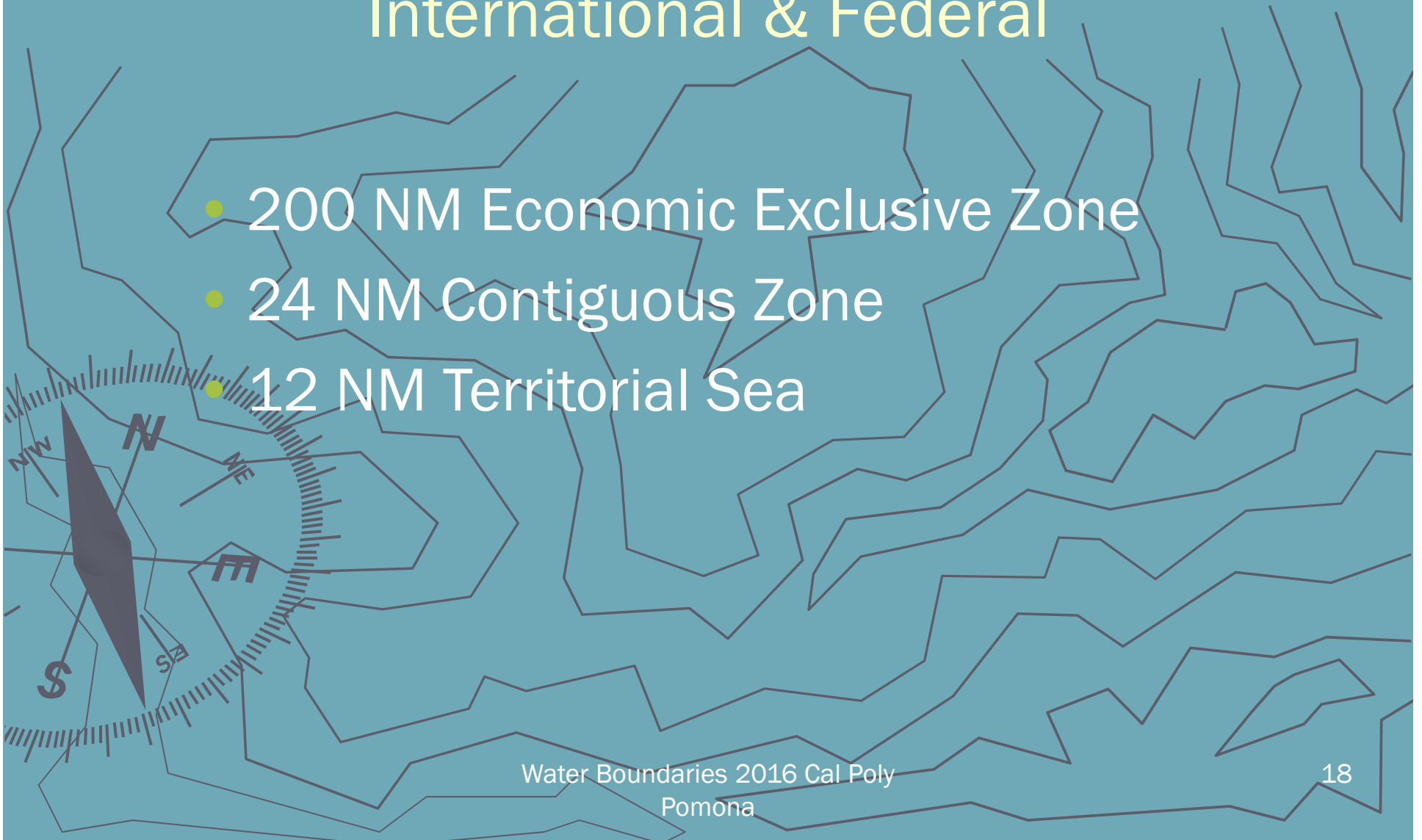
LET'S TAKE A LOOK AT
THE GENERAL "RULES"...





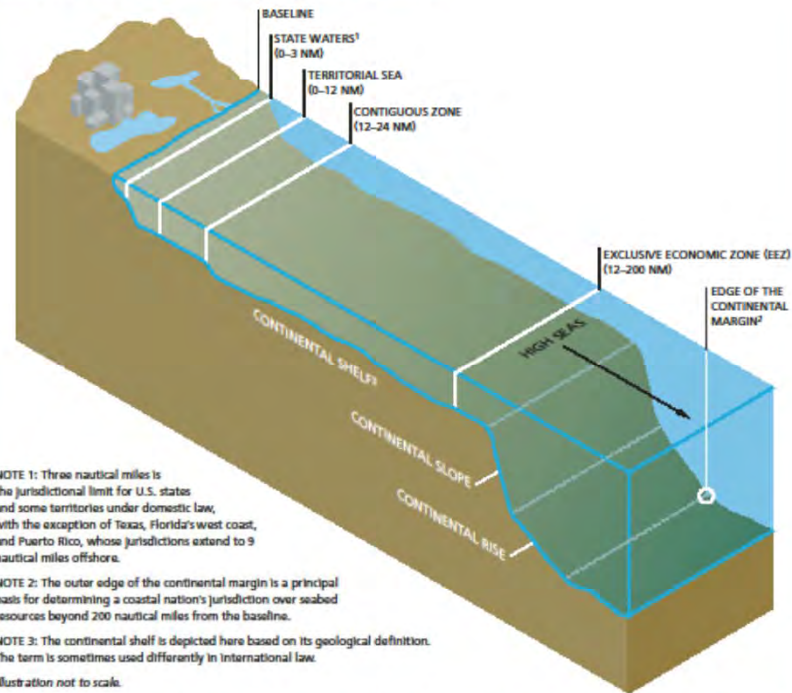
Water Boundaries International & Federal

- 200 NM Economic Exclusive Zone
- 24 NM Contiguous Zone
- 12 NM Territorial Sea



Water Boundaries - International & Federal

Figure P.1 Lines of U.S. Authority in Offshore Waters



Several jurisdictional zones exist off the coast of the United States for purposes of international and domestic law. Within these zones, the United States asserts varying degrees of authority over offshore activities, including living and nonliving resource management, shipping and maritime transportation, and national security. A nation's jurisdictional authority is greatest near the coast.

Water Boundaries State (California) & Upland Title

- Tidal, Navigable boundary is MHW
- Non-tidal, navigable boundary is MLW
- Always be aware of a Public Trust Easement MHW to MLW
- These provisions have been codified as a starting point – CC §670.

Water Boundaries State (California) & Upland Title

- Property adjacent to **NAVIGABLE, NON-TIDAL** waters

State owns bed from LWM

Even if meander present, ownership extends to LWM

Area between HWM and LWM is “shorezone”, very likely subject to a public trust easement.

Water Boundaries State (California) & Upland Title

- Rivers, Lakes & Islands per 1973 Manual of Surveying Instructions

Meander Required

- ▶ Both sides of navigable rivers, bayous
- ▶ Both sides of non-navigable rivers 3 chains wide
- ▶ Lakes 50 acres or more
- ▶ Every island above MHW in navigable or non-navigable river EXCEPT

If formed AFTER 09.09.1850

Meander Not Required

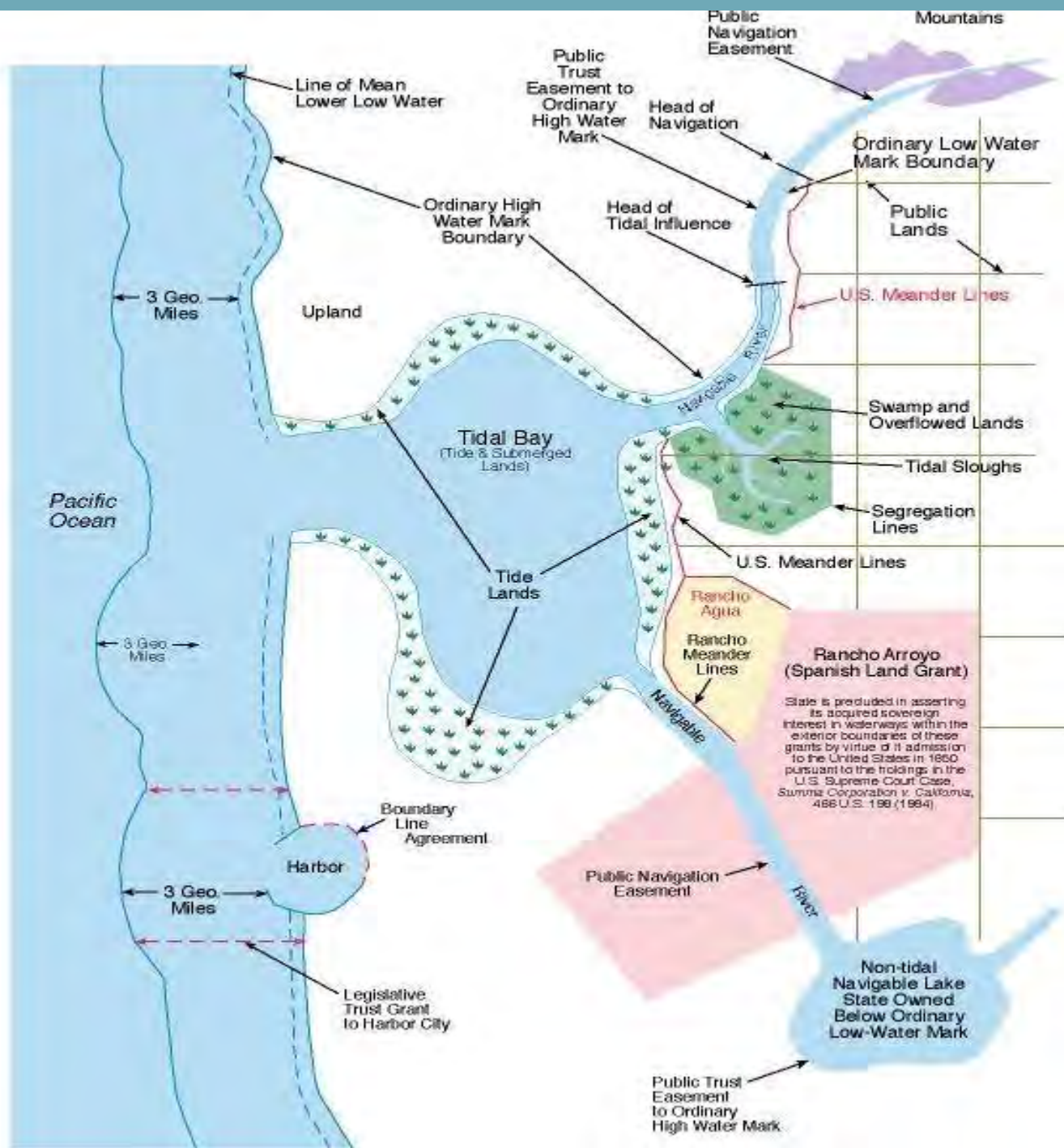
- ▶ Poorly defined streams no matter width
- ▶ Ephemeral or shallow lakes

Water Boundaries State (California) & Upland Title

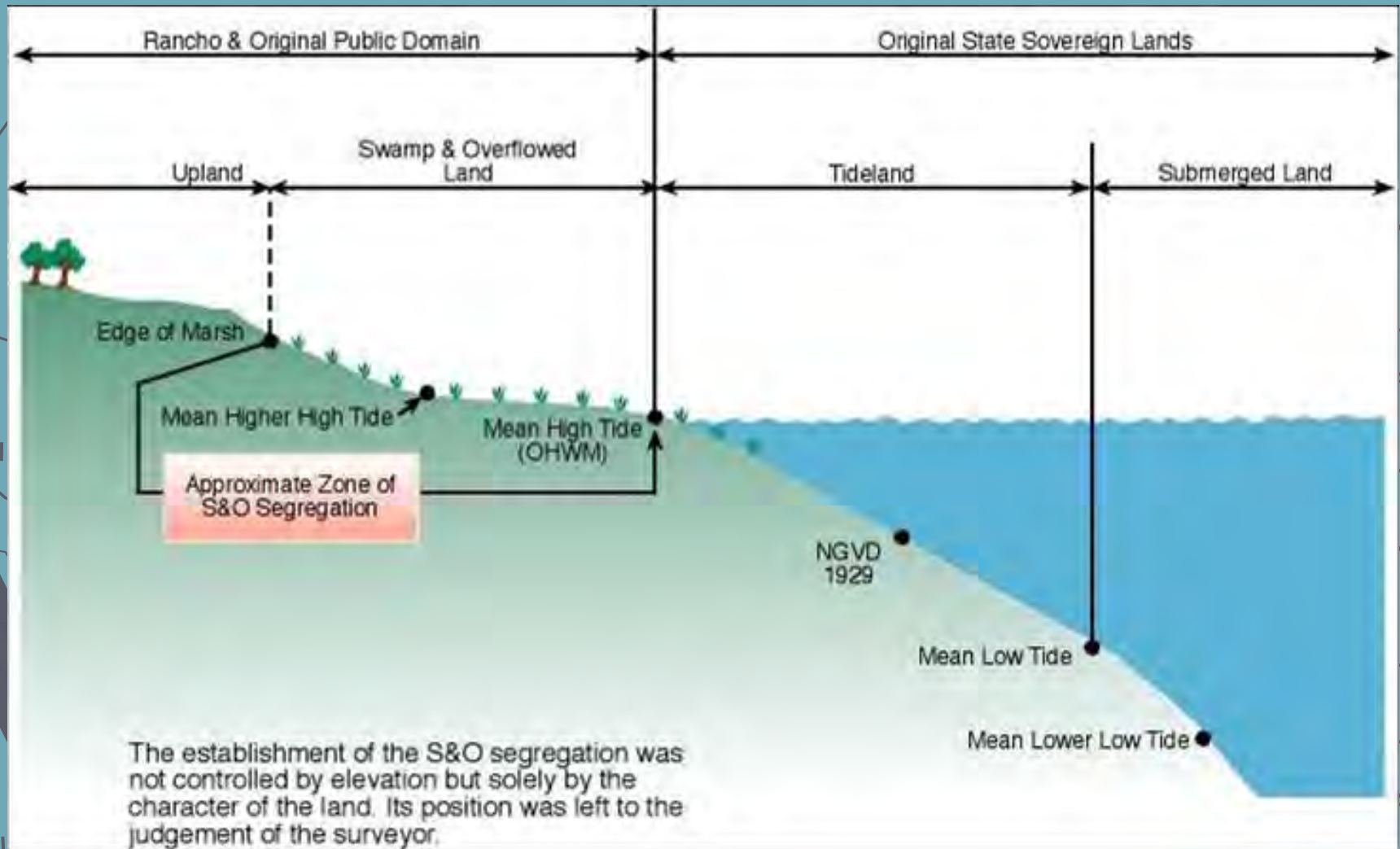
Islands in a meander-able body of water, either navigable or non-navigable, in continuous existence since 09.09.1850, remain public lands of US

Civil Code 670

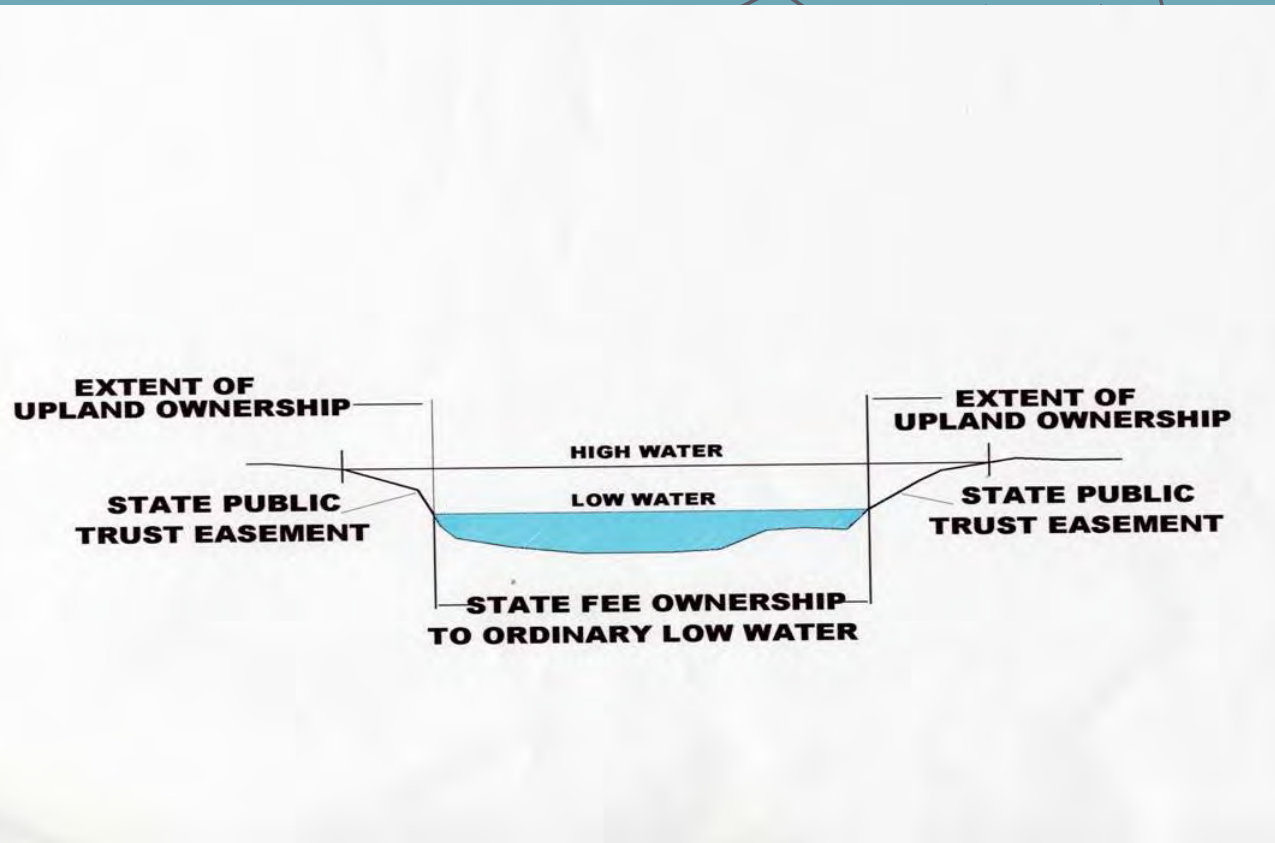
- ▶ (670.) The State is the owner of all land below tide water, and below ordinary high-water mark, bordering upon tide water within the State; of all land below the water of a navigable lake or stream; of all property lawfully appropriated by it to its own use; of all property dedicated to the State; and of all property of which there is no other owner.



Navigable, tidal



Navigable, non tidal



Water Boundaries LWM

- Location of Low Water Mark

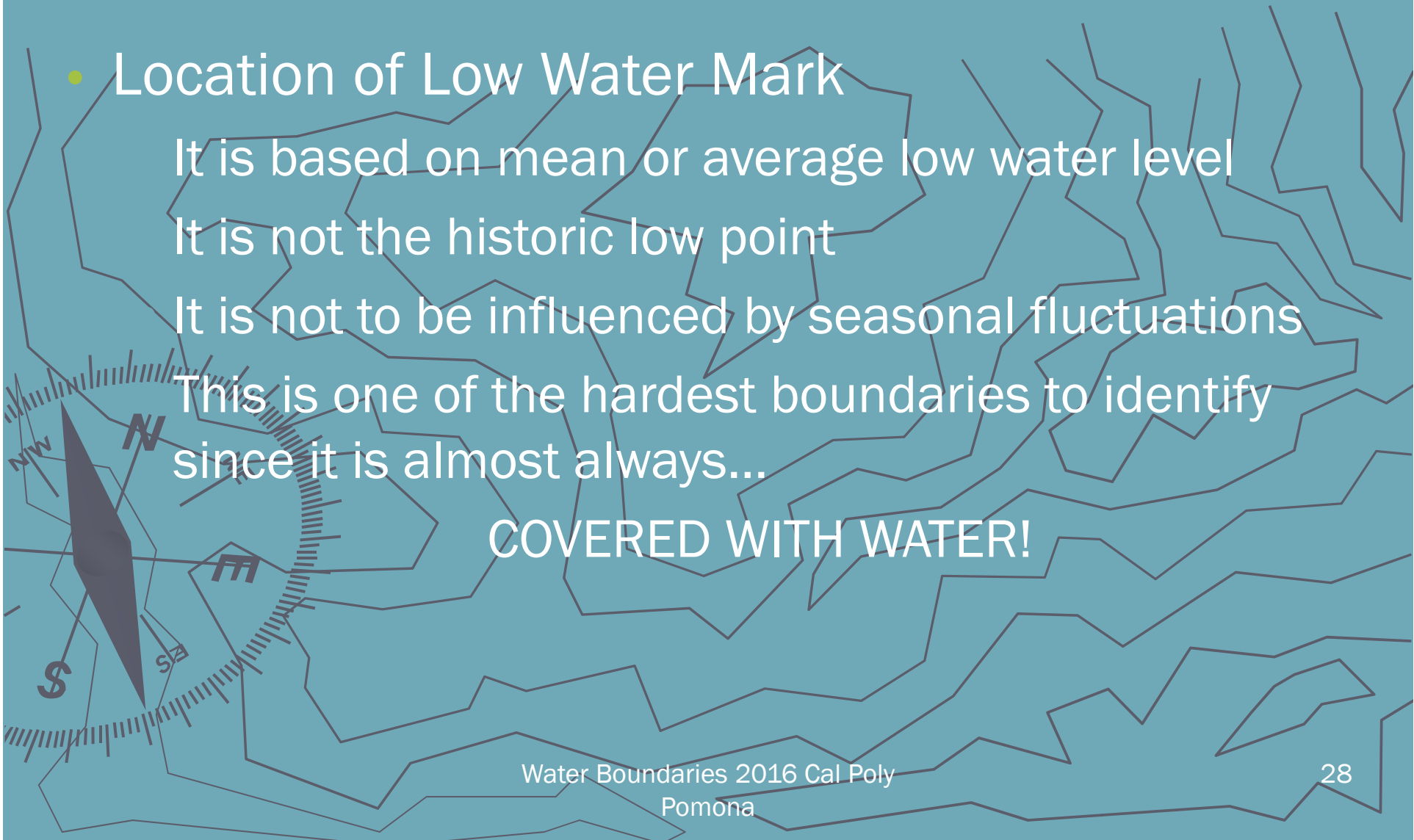
It is based on mean or average low water level

It is not the historic low point

It is not to be influenced by seasonal fluctuations

This is one of the hardest boundaries to identify since it is almost always...

COVERED WITH WATER!



Water Boundaries

Private Title

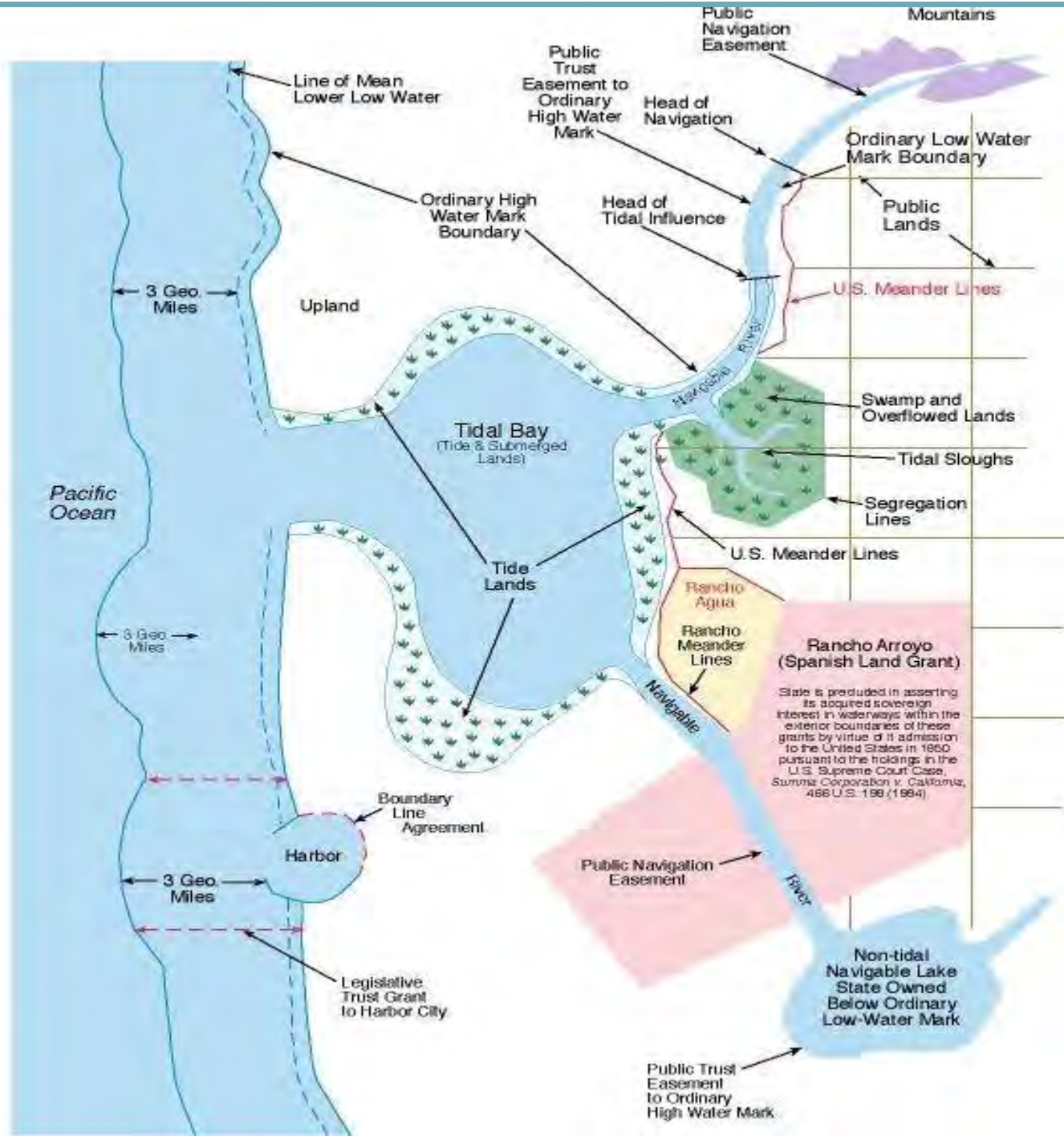
- Non-tidal, non-navigable water boundary is “generally” the center of a stream, creek, lake, etc. unless intent is different
- Always be aware of a possible Public Trust Easement, even to private waters!
- These provisions have been codified as a starting point – CC §830.

Civil Code 830

- ▶ (830.) Except where the grant under which the land is held indicates a different intent, the owner of the upland, when it borders on tide water, takes to ordinary high-water mark; when it borders upon a navigable lake or stream, where there is no tide, the owner takes to the edge of the lake or stream, at low-water mark; when it borders upon any other water, the owner takes to the middle of the lake or stream.

Civil Code 1014 & 1015

- ▶ **1014.** Where, from natural causes, land forms by imperceptible degrees upon the bank of a river or stream, navigable or not navigable, either by accumulation of material or by the recession of the stream, such land belongs to the owner of the bank, subject to any existing right of way over the bank.
- ▶ **1015.** If a river or stream, navigable or not navigable, carries away, by sudden violence a considerable and distinguishable part of a bank, and bears it to the opposite bank, or to another part of the same bank, the owner of the part carried away may reclaim it within a year after the owner of the land to which it has been united takes possession thereof.



Water Boundaries

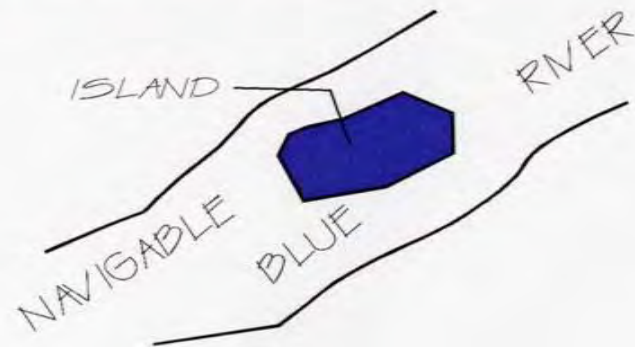
Unusual Situations - Islands

- Islands existing pre-statehood are still in public domain and, when surveyed, are available for disposal by Feds.
- Islands arising in navigable, non-tidal rivers or lakes belong to the state
- Islands arising in non-navigable streams and lakes are divided according to ownership lines
- These provisions have been codified as a starting point – CC §§ 1016, 1017, 1018.

Water Boundaries

Unusual Situations – Islands

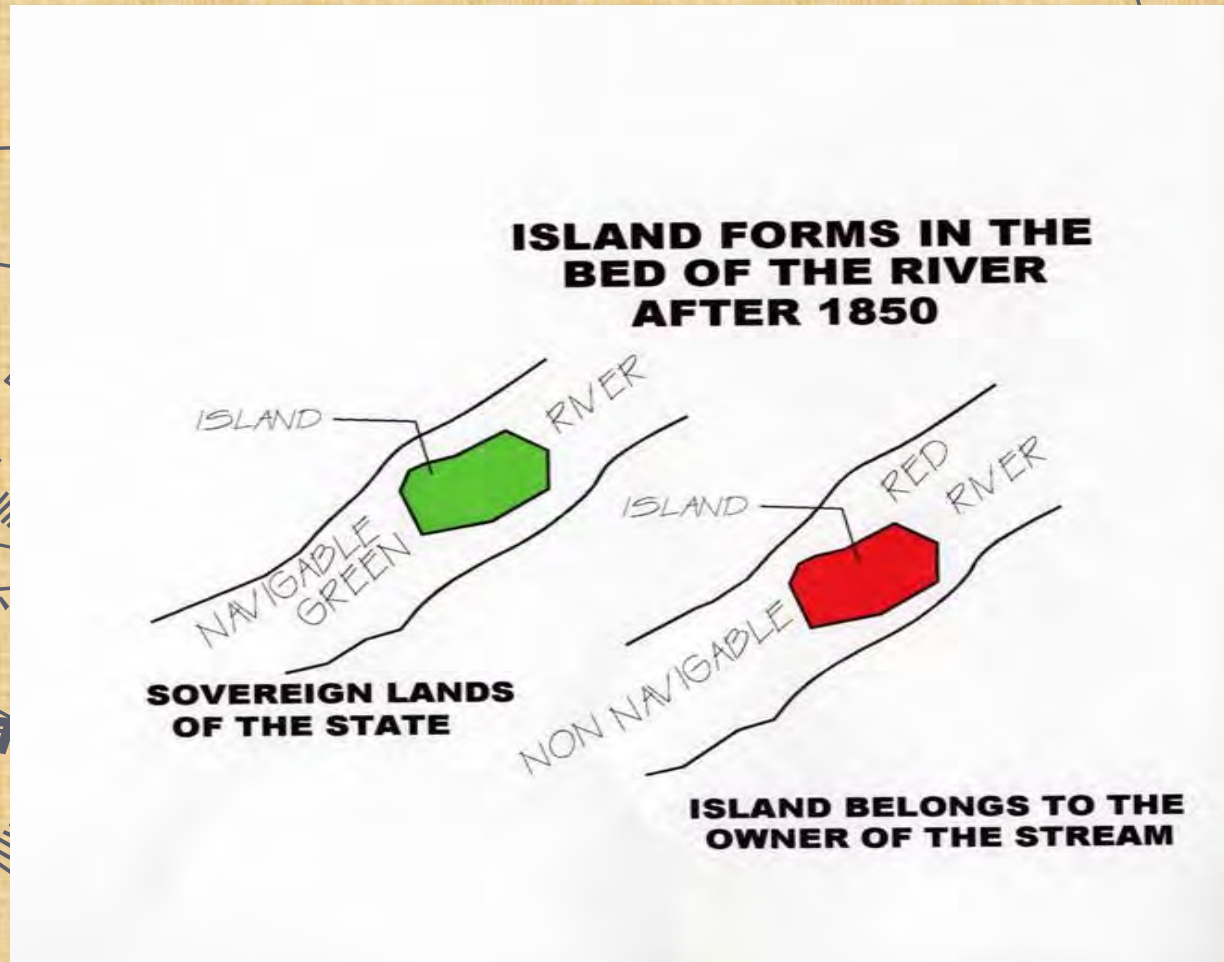
ISLAND PRESENT IN 1850



**PUBLIC LANDS OF
THE UNITED STATES**

Water Boundaries

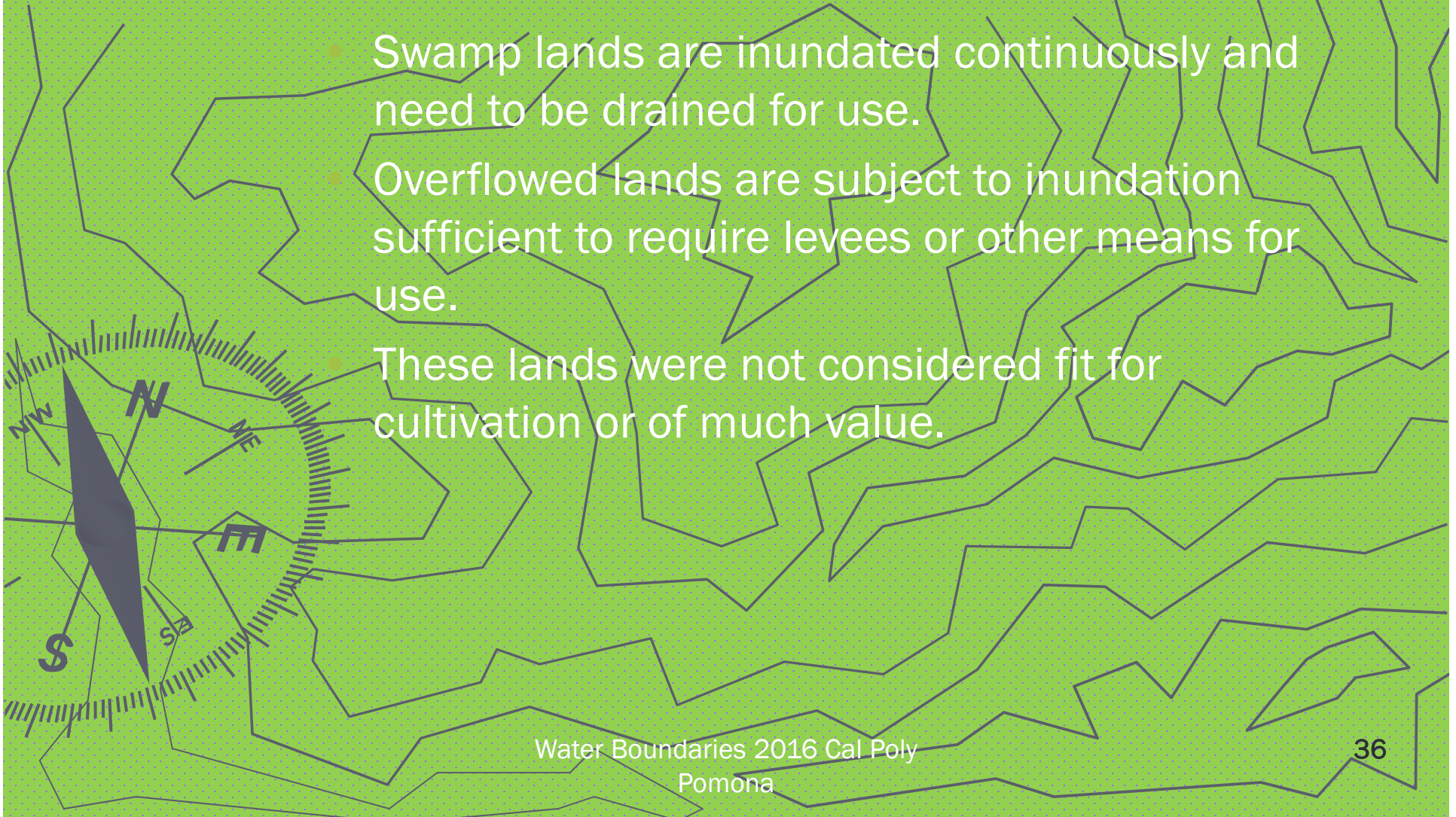
Unusual Situations - Islands



Water Boundaries

Unusual Situations – S&O Lands

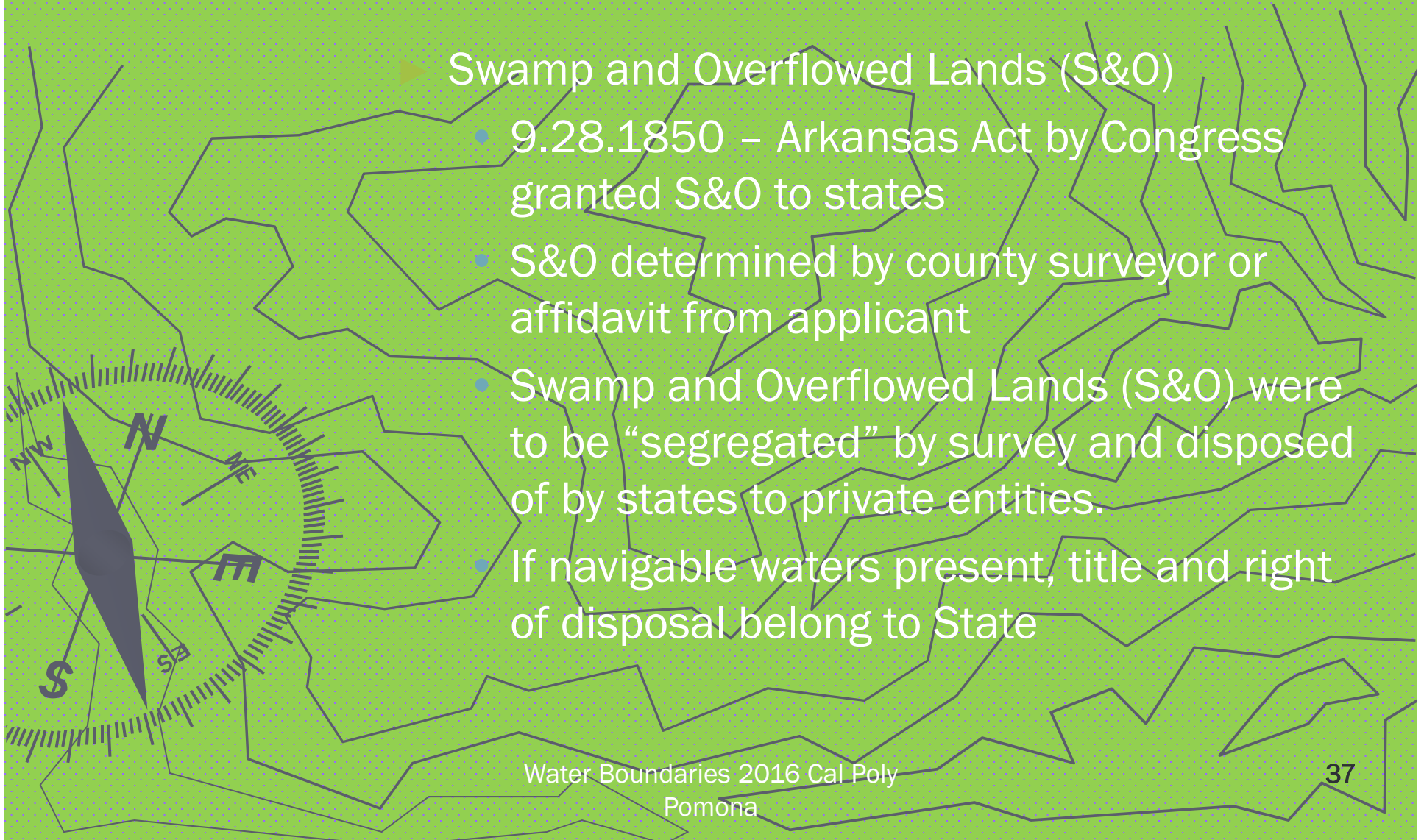
- Swamp lands are inundated continuously and need to be drained for use.
- Overflowed lands are subject to inundation sufficient to require levees or other means for use.
- These lands were not considered fit for cultivation or of much value.



Water Boundaries

Unusual Situations – S&O Lands

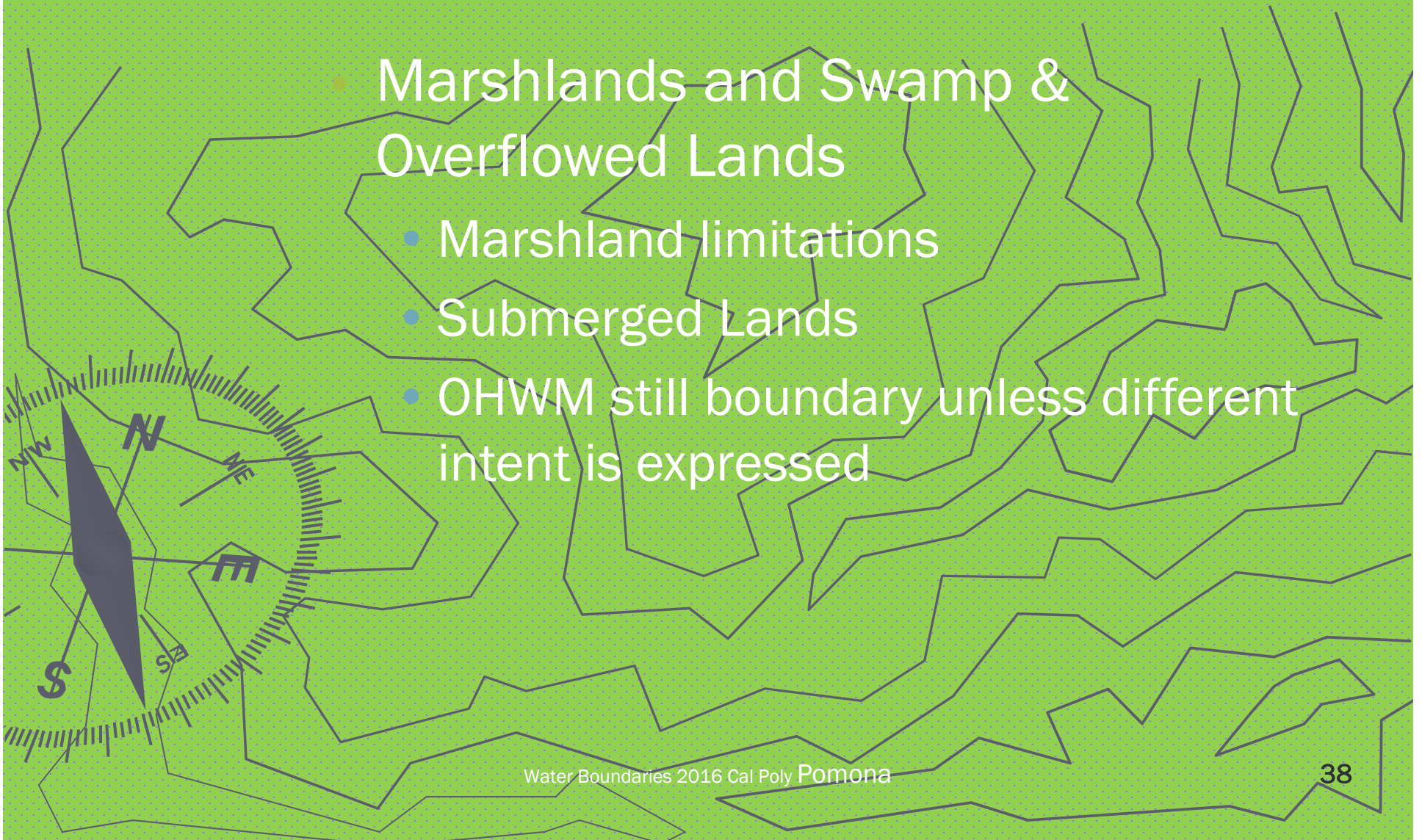
- ▶ Swamp and Overflowed Lands (S&O)
 - 9.28.1850 – Arkansas Act by Congress granted S&O to states
 - S&O determined by county surveyor or affidavit from applicant
 - Swamp and Overflowed Lands (S&O) were to be “segregated” by survey and disposed of by states to private entities.
 - If navigable waters present, title and right of disposal belong to State



Water Boundaries

Unusual Situations – S&O Lands

- Marshlands and Swamp & Overflowed Lands
 - Marshland limitations
 - Submerged Lands
 - OHWM still boundary unless different intent is expressed



Water as a property boundary – Some of the rules

- Miller & Starr California Real Estate 3rd Edition, 2008

Chapter 8 – DEEDS

- Section 48: Water as a property boundary

Water as Property Boundary

- The general rules...sometimes it depends...
- Civil Code 670
- Civil Code 830
- Civil Code 1014 et seq
- Government Code 66610
- Codified Case Law

Government Code 66610

- ▶ Includes definitions of
 - sloughs
 - marshlands
 - tidelands
 - submerged lands

- ▶ Meant to authorize San Francisco Bay Conservation and Development Commission (SFBCDC)

- ▶ Not meant to define land boundaries??

TIDES

- Tide waters
 - Subject to daily ebb and flow of the tide
 - OHWM in California is defined as average of NEAP high tides
 - Not exceptional tides
 - Who the heck keeps track of NEAP tides???

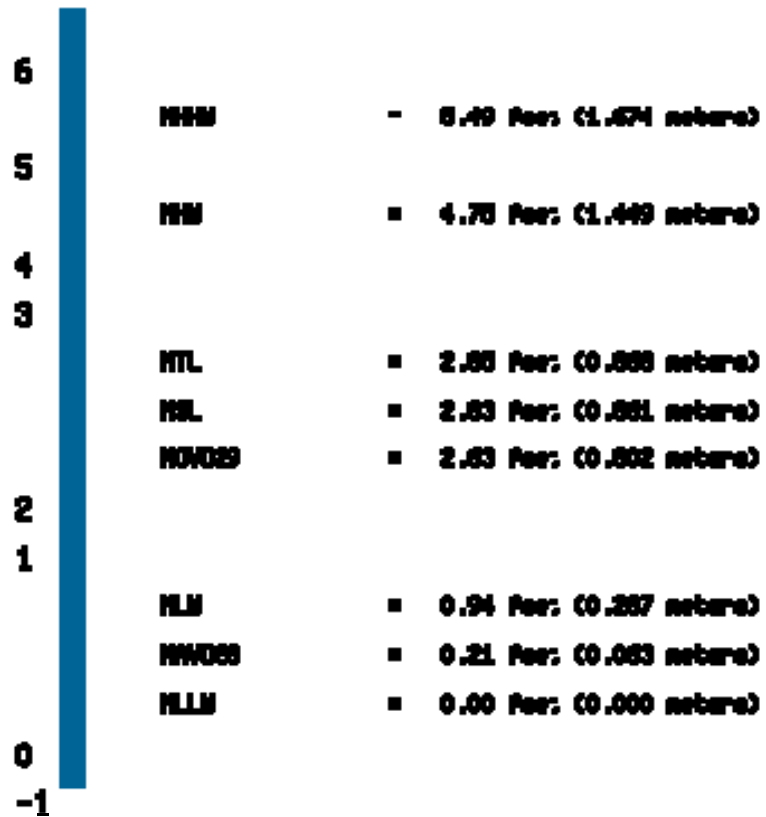
TIDES

- Boundary of Tidelands
 - Border for tidelands is OHWM or MHWL or MHTL
 - State holds and owns tidelands in trust
 - MHTL is ordinary high tide
 - Line moves
 - If private ownership below OHWM, public trust still operative
 - Different intent may be shown
 - Watch for former sovereignty

TIDES

Elevation Information

PID: 0Y1003
WI: 1001
Station ID: 941000
Epoch: 1983-2001
Date: Thu Mar 13 21:03:07 EDT 2008



TIDES

Bench Mark Sheet for 9412110, Port San Luis CA




Showing Bench Mark Information for

9412110 Port San Luis, CA

Present Epoch

Superseded Epoch (benchmarks.html?id=9412110&type=superseded)



-  Station Location
-  Published bench mark
-  Unpublished bench mark

TIDES

- T I D A L B E N C H M A R K S

- PRIMARY BENCH MARK STAMPING: 6 1936
- DESIGNATION: 941 2110 TIDAL 6
- MONUMENTATION: Bench Mark disk VM#: 945
- AGENCY: US Coast and Geodetic Survey (USC&GS) PID#: FV0898
- SETTING CLASSIFICATION: Rock outcrop

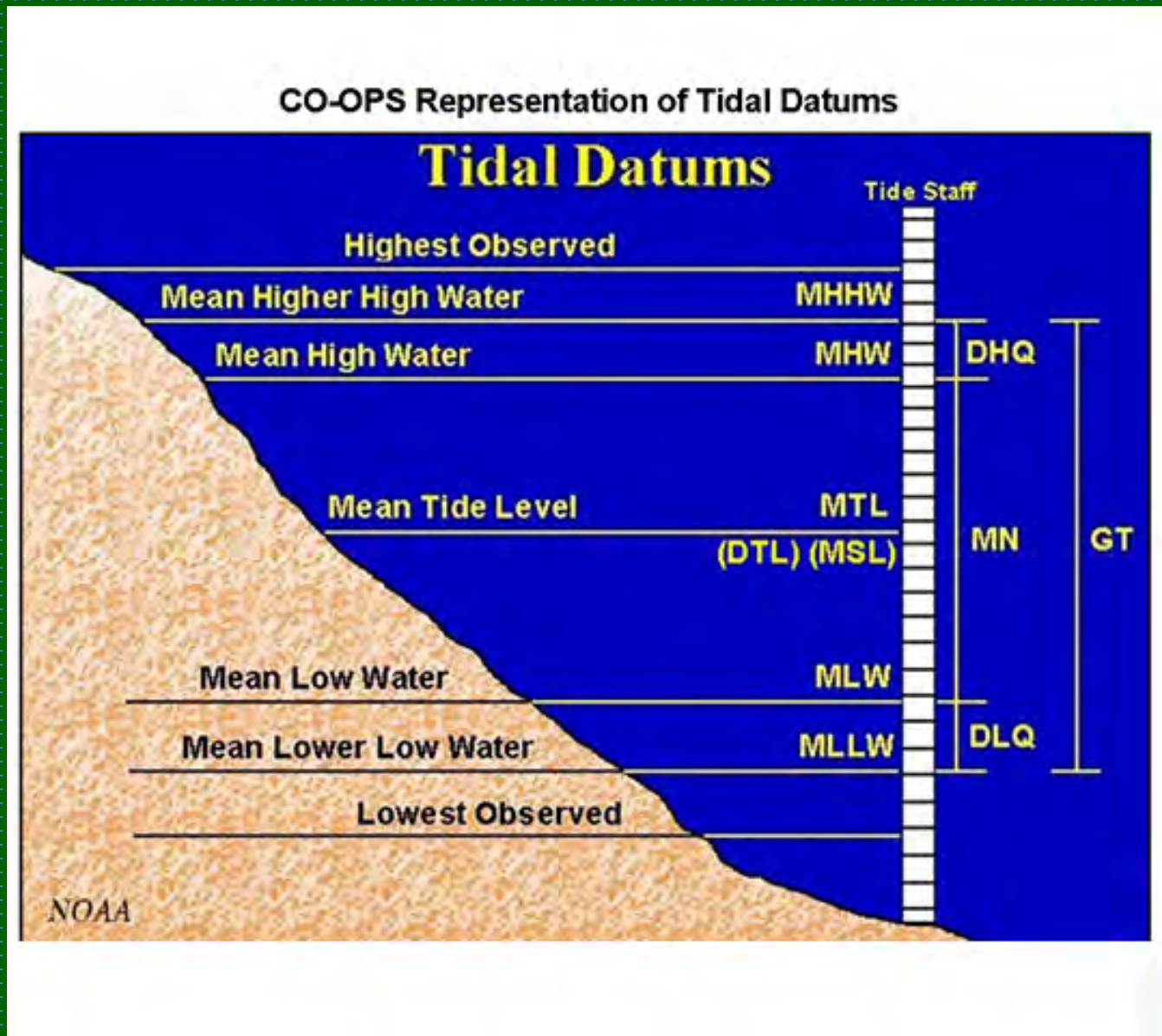
- The primary bench mark is a disk set in the top of a rock outcrop at the inshore end of the pier, 53 m (175 ft) SW of a flagpole, 17 m (55 ft) NE of the east guy pole of the most eastern of two crabbing docks, 7.92 m (26.0 ft) ESE of a brass fire hydrant surrounded by four metal posts at the SW corner of the pier, 2.38 m (7.8 ft) SW of the SW edge of the pier, and 1 m (2 ft) below the pier floor, and 0.34 m (1.1 ft) SW of SW end of a 0.3 m (1 ft) square timber supporting the inshore end of the wharf.

TIDES

- T I D A L D A T U M S
- Tidal datums at PORT SAN LUIS, PACIFIC OCEAN based on:
 - LENGTH OF SERIES: 19 Years
 - TIME PERIOD: January 1983 - December 2001
 - TIDAL EPOCH: 1983-2001
 - CONTROL TIDE STATION:
- Elevations of tidal datums referred to Mean Lower Low Water (MLLW), in METERS:
 - HIGHEST OBSERVED WATER LEVEL (01/18/1973) = 2.331
 - MEAN HIGHER HIGH WATER MHHW = 1.623
 - MEAN HIGH WATER MHW = 1.408
 - MEAN TIDE LEVEL MTL = 0.863
 - MEAN SEA LEVEL MSL = 0.853
 - MEAN LOW WATER MLW = 0.317
 - North American Vertical Datum NAVD88 = 0.024
 - MEAN LOWER LOW WATER MLLW = 0.000
 - LOWEST OBSERVED WATER LEVEL (01/07/1951) = -0.732
- North American Vertical Datum (NAVD88)
- Bench Mark Elevation Information In METERS above:

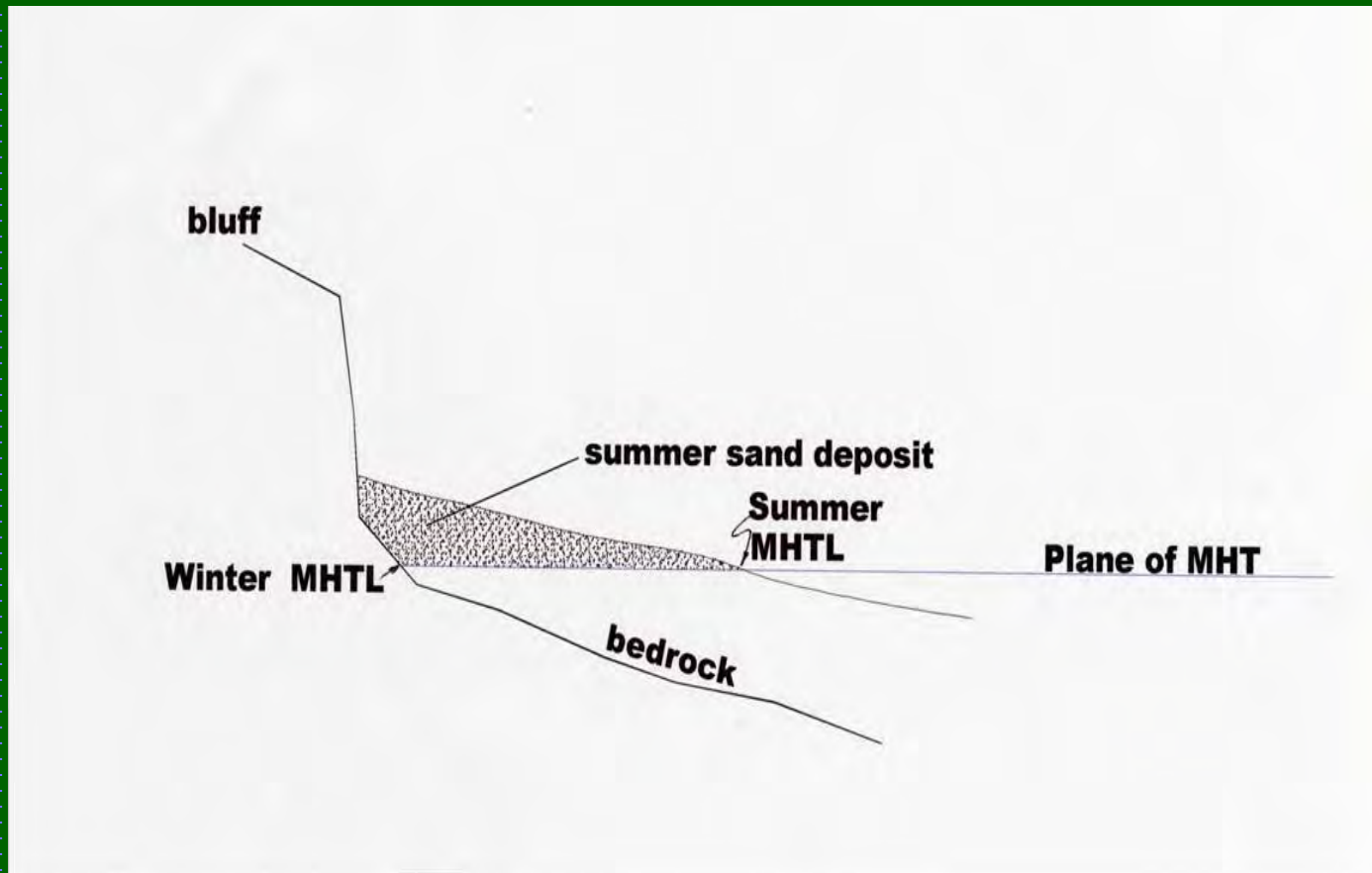
Stamping or Designation	MLLW	MHW
• 6 1936	4.395	2.987
• NO 16 1973	2.839	1.431
• TIDAL BM 18 1975	3.555	2.147
• TIDAL BM 20 1975	10.146	8.738
• 2110 A 1982	4.628	3.220
• 2110 D 1982	3.416	2.008
• NO 15 1971 RESET 1983	4.825	3.417
• MAR 3 LS 3354	4.814	3.406
• 2110 E 2000	9.786	8.378

TIDES



TIDES

Unmoving what, moving where



TIDES

- Conveyances along bank of tidal, navigable river
 - Meanders along tidal rivers do not affect actual boundary, OHWM is still boundary
 - If there actually is private ownership below OHWM, a public trust easement is still operative
 - Different intent may be shown
 - Watch for former sovereignty

NAVIGABILITY

- Determination when water is non-tidal
- Depends on navigability 09.09.50
 - If navigable, but non-tidal, boundary is LWM
 - If non-navigable, boundary is “middle” (remember CC 830)

NAVIGABILITY

- Test for NAVIGABILITY
- Determined by fact: A water body may be deemed navigable:
 - If it is SUSCEPTIBLE to navigation in its ordinary condition;
 - Even if navigation has NOT been continuous;
 - Even if navigability is not EASY...nothing ever is....

Water Boundaries Rule Changers

- Miller & Starr California Real Estate 3rd Edition, 2008
 - Chapter 8 – DEEDS
 - Section 49: Effect of erosion, accretion, and reliction

Water Boundaries Rule Changers

- Rule changers:
 - Erosion
 - Accretion
 - Reliction
 - Avulsion
 - Reemergence
 - Artificial (non-natural) changes
 - These are codified as a starting point.

Water Boundaries Rule Changers

- Movement of Boundary line through erosion
 - Lines moves with time and erosion

Water Boundaries Rule Changers

- Movement of boundary line by reliction
 - Owner of adjacent land acquires land through reliction
 - Subject to right of way

Water Boundaries Rule Changers

- CIVIL CODES 1014 & 1015
- **1014.** Where, from natural causes, land forms by imperceptible degrees upon the bank of a river or stream, navigable or not navigable, either by accumulation of material or by the recession of the stream, such land belongs to the owner of the bank, subject to any existing right of way over the bank.
- **1015.** If a river or stream, navigable or not navigable, carries away, by sudden violence a considerable and distinguishable part of a bank, and bears it to the opposite bank, or to another part of the same bank, the owner of the part carried away may reclaim it within a year after the owner of the land to which it has been united takes possession thereof.

Water Boundaries Rule Changers Erosion, Accretion, Reliction, Avulsion

- Changes due to erosion, accretion and reliction benefit a riparian or littoral owner
 - Must be gradual and imperceptible
- Changes due to avulsion may not benefit a riparian or littoral owner
 - Avulsion must be sudden and perceptible
 - An Avulsed owner can “recover” lands if not attached to different owner

Water Boundaries Rule Changers Artificial (non-natural) Changes

- Normally, artificial works do not affect LAND boundaries
 - For private lands, adverse possession may arise
 - One cannot adversely possess against the State
- Effect of construction of artificial works on water boundaries:
 - Boundary line determined by current artificial level
 - Where tidelands have been reclaimed, there may still be a public trust

Water Boundaries Rule Changers

Effects of erosion, accretion and reliction

- Movement of Boundary line through accretion
 - Alluvium belongs to riparian owner
 - If deposition is gradual and imperceptible
 - Exception may be length of time
 - State could be owner if long enough time elapsed to provide “undue benefit”

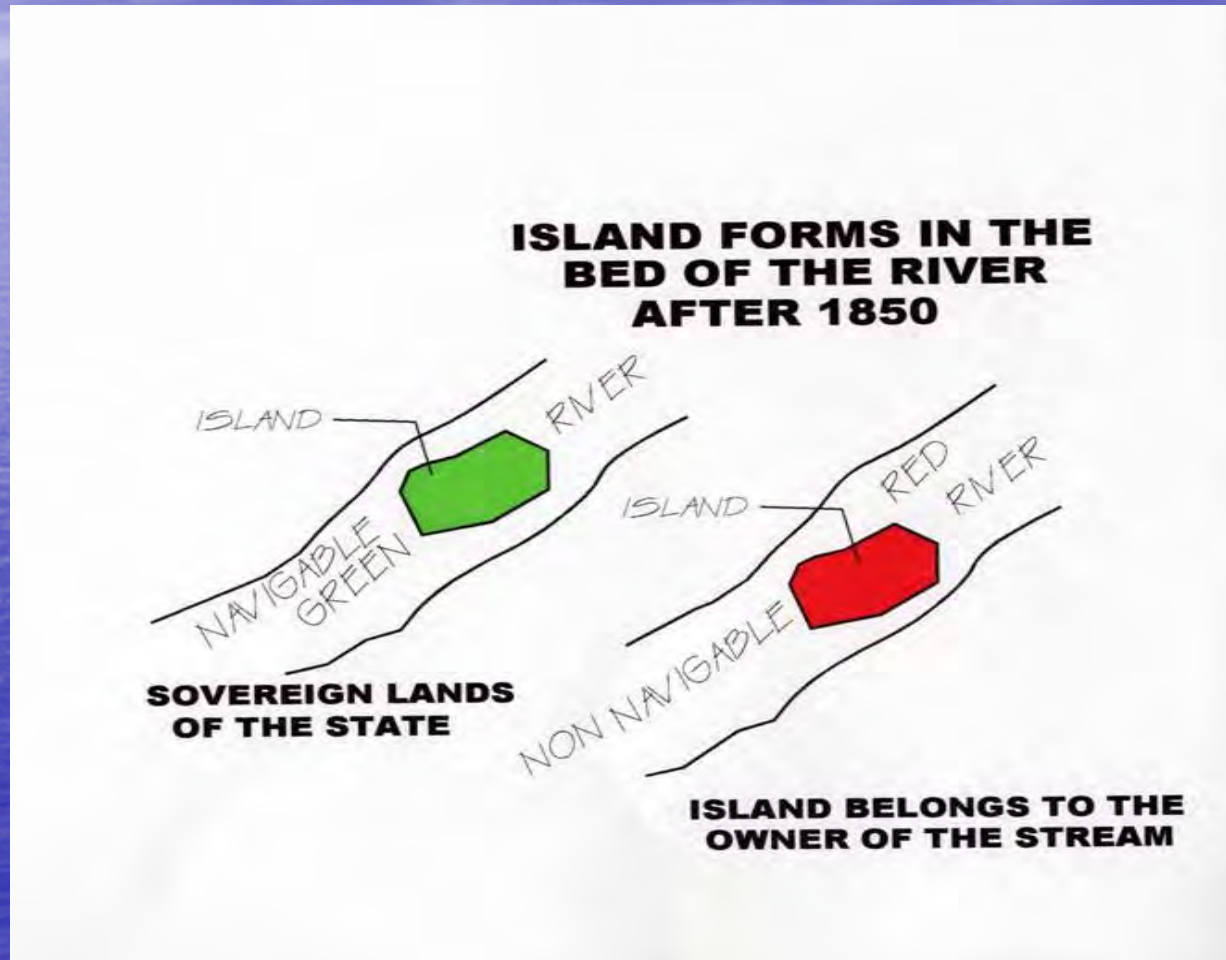
Water Boundaries Rule Changers Existing rights

- Right of way access to water
 - Automatically extends to boundary line across accreted or relicted lands

Water Boundaries Rule Changers Existing rights

- Title of islands formed by accretion
 - Passes to owner of bed
 - If navigable, State is owner
 - If non-navigable, owner of bed acquires islands
 - If on one side, belongs to owner of that side
 - If in middle, owned by owners of both sides, based on division of bed

Water Boundaries Rule Changers Accretion of Islands

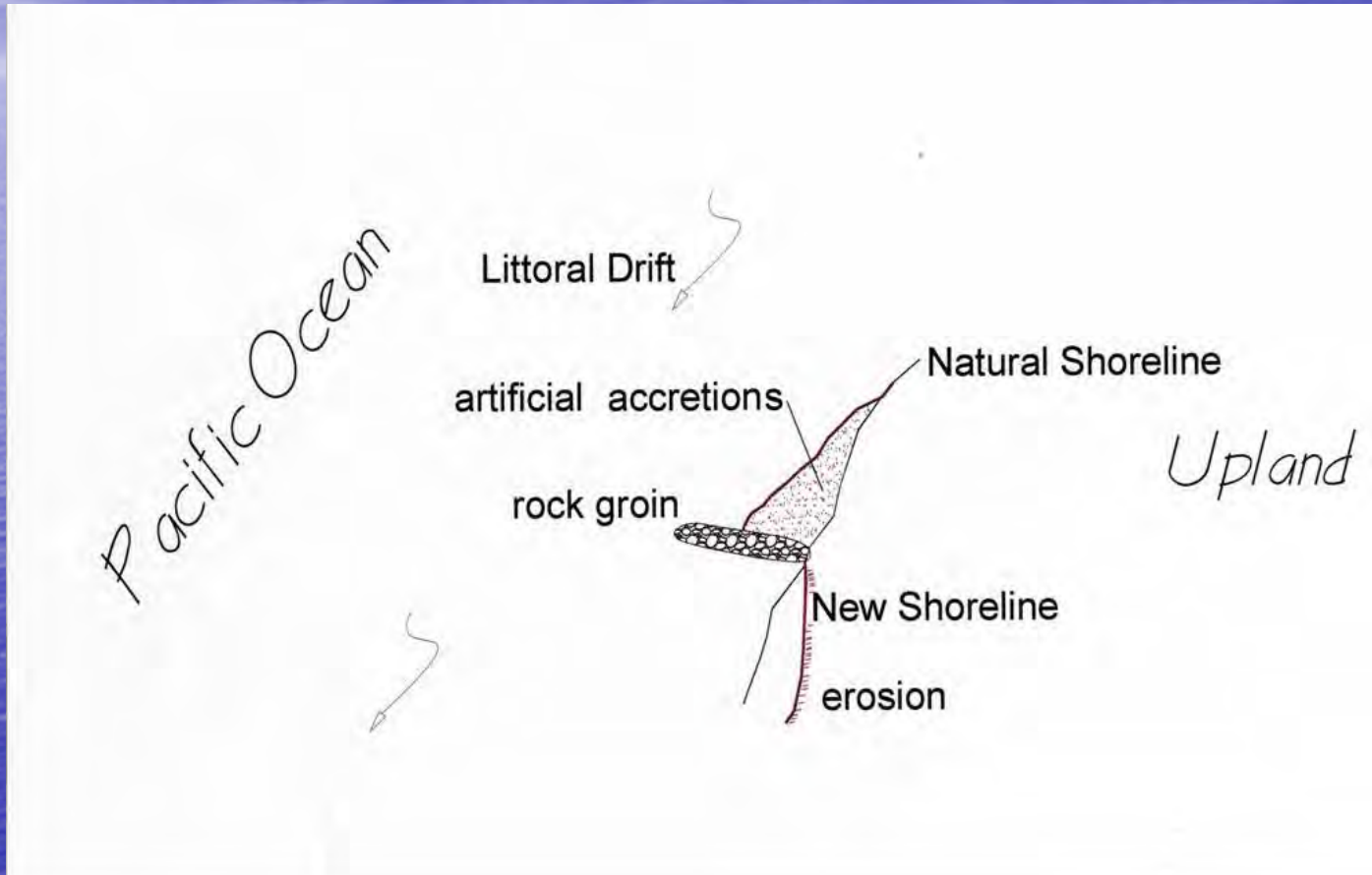


Water Boundaries Rule Changers Artificial Causes

- Accretion due to artificial causes
 - Adjacent to tidal waters
 - California does NOT recognize general accretion rules: State is owner due to its ownership of bed. BUT....
 - If artificial cause is remote, littoral owner may acquire ownership of artificially caused accretion
 - Adjacent to non-tidal, non-navigable waters
 - Adjacent owners may acquire title to accreted lands

Rule Changers

Artificial Construction



Water Boundaries Rule Changers Artificial Causes

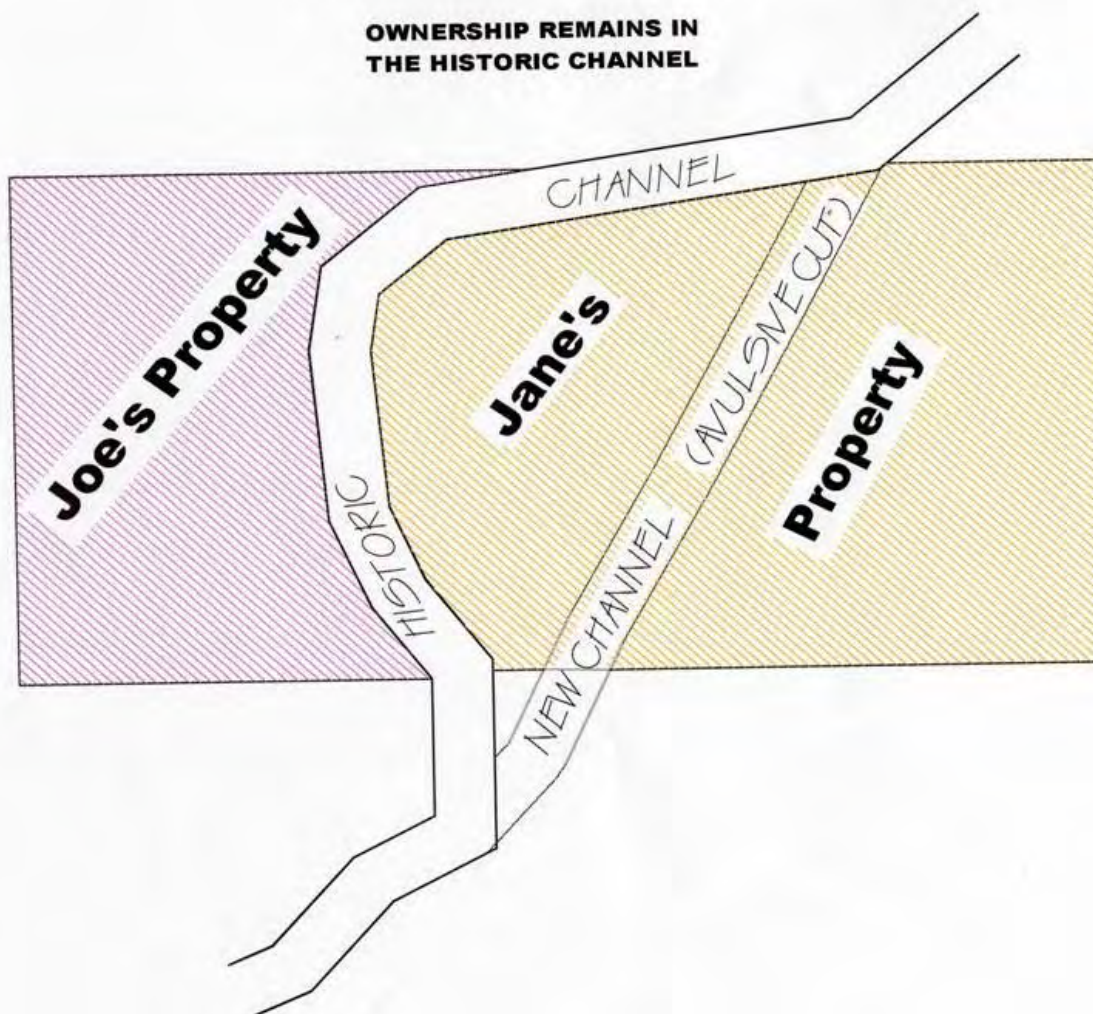
- Application of rules to oceans and lakes
- Same general rules apply to ocean and lakes
 - If artificial structure causing accretion is below OHWL, accretion belongs to State
 - Shoreline owner has no title to bordering tidelands that are artificially filled

Water Boundaries Rule Changers Avulsion

- Movement of boundary by avulsion
 - Sudden and perceptible
 - Riparian owner loses riparian rights
 - Avulsed owner can recover if within one year of event
 - Common law right to reclaim avulsed land if not attached to another by filling in separating channel

**PROPERTY BOUNDARIES
REMAIN AS THEY WERE
PRIOR TO THE AVULSIVE CUT**

**OWNERSHIP REMAINS IN
THE HISTORIC CHANNEL**



RESOURCES

Useful books and publications

- ▶ Glossaries for Surveyors, Minnick
- ▶ Shore and Sea Boundaries, Vol I & II, Shalowitz
- ▶ River and Lake Boundaries, Simpson
- ▶ Water Boundaries, Cole
- ▶ Tidal Datum Planes Rev.1951, H.A.Marmer

RESOURCES

Useful books and publications

- ▶ USACE Engineering Manual Hydrographic Surveying, USACE
- ▶ Tidal Datums and their Applications, NOAA Special Publication NOS CO-OPS 1
- ▶ Computational Techniques for Tidal Datums Handbook, NOAA Special Publication NOS CO-OPS 2

RESOURCES

Useful books and publications

- ▶ Our Restless Tides, NOAA NOS
- ▶ Manual of Surveying Instructions
1973, US Dept. of Interior, BLM
- ▶ CLSA Water Boundaries Workshop,
1976

NEVER QUIT LEARNING...



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