

Drawing Lines in Law Books and on Sandy Beaches

*Great Lakes Community Resilience:
A No Adverse Impact Approach Workshop*

Milwaukee, WI

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Some Terms

- * **Littoral:** Pertaining to still water – an ocean or large lake
- * **Riparian:** Pertaining to moving water – river or creek
- * **Tidal:** Subject to lunar diurnal water level fluctuations
- * **IGLD:** Lake water level elevation reference (to sea level)

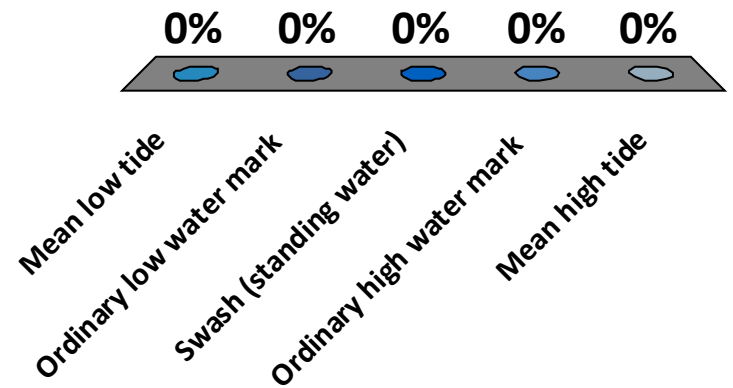
- * **Accretion:** imperceptible gain in shore through deposit of soils
- * **Reliction:** imperceptible gain in shore through withdrawal of water (often addressed collectively as ‘accretion’)
- * **Erosion:** imperceptible loss of shore through through submergence of soils (eroded or covered)
- * **Avulsion:** sudden and noticeable change in the shoreline

Public Trust Doctrine

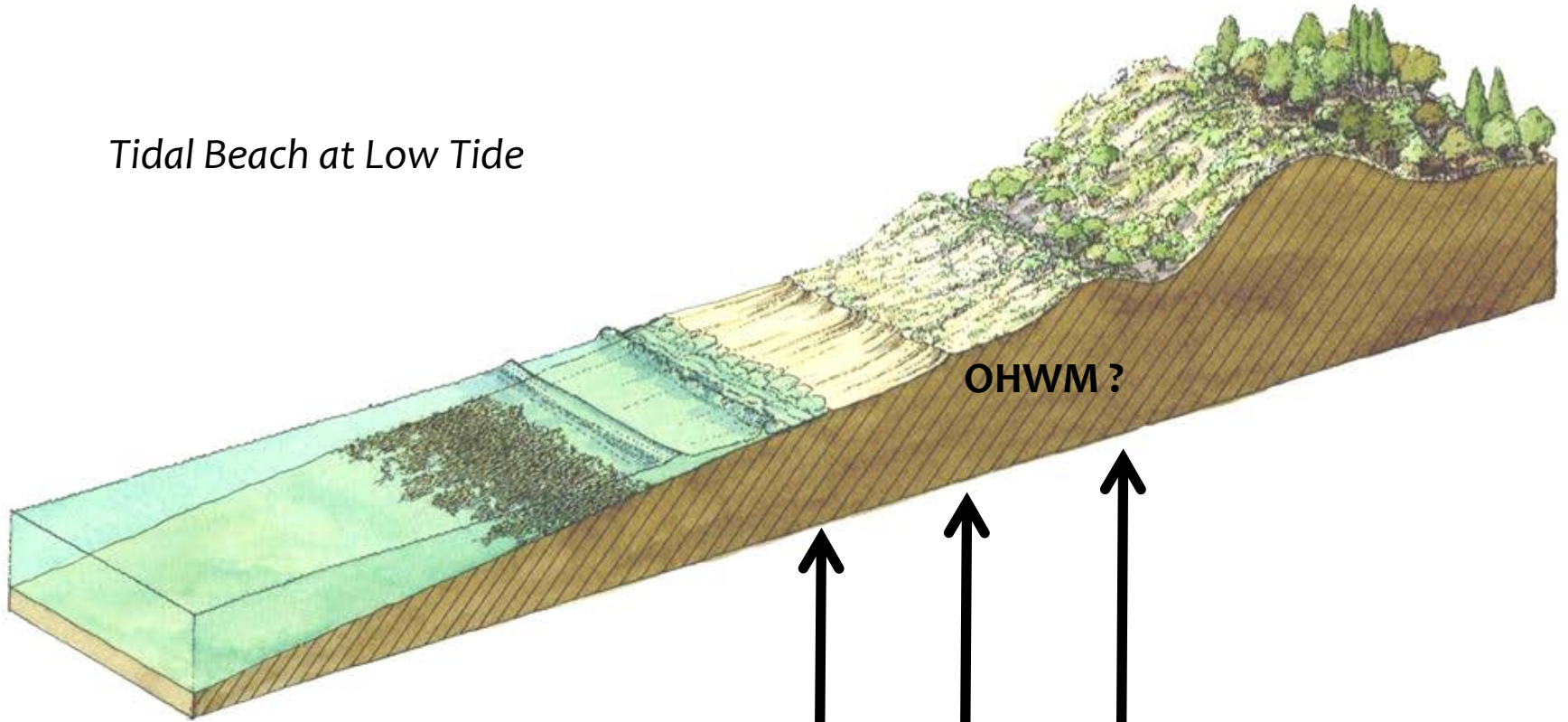
- * Developed in ocean-tidal settings
- * Creates:
 - * State fee ownership of submerged lands (generally)
 - * Public Trust Interest in shorelands
 - * State interest in shorelands up to some point
 - * Public beachcombing, hunting, fishing, strolling, navigation
 - * Servitude of some type on privately owned beach
 - * No interruption of permissible uses

Question: To what point landward does the Public Trust Interest normally extend?

- A. Mean low tide
- B. Ordinary low water mark
- C. Swash (standing water)
- D. Ordinary high water mark
- E. Mean high tide



Tidal Beach at Low Tide



Submerged Land:
Always owned by the State



Wet
Beach

Mean
low tide



Dry
Beach

Mean
high tide



Upland (?):
Owned in fee

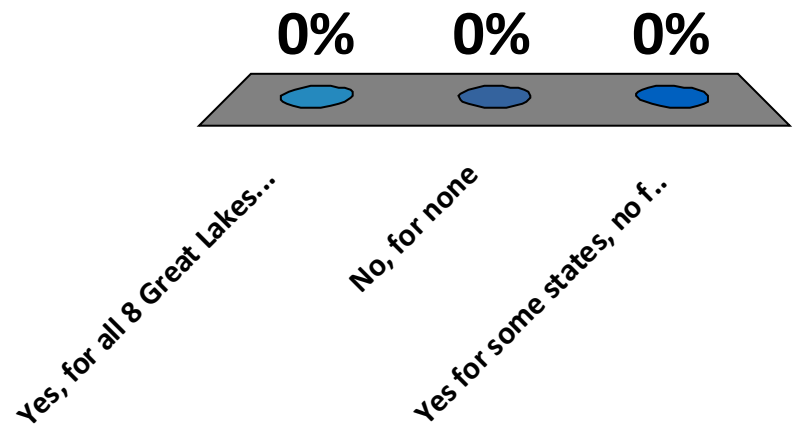
Vegetation
line (?)

OHWM ?

New Jersey:	State -----	public trust -----	
Hawaii:	State -----	public trust -----	
Oregon:	State -----	public trust -----	
Texas:	State -----	public trust -----	“RE” -----
Maine:	State -----	public trust -----	
Massachusetts:	State -----	public trust -----	

Question: To what point landward does the Public Trust Interest normally extend?

- A. Yes, for all 8 Great Lakes states
- B. No, for none
- C. Yes for some states, no for some



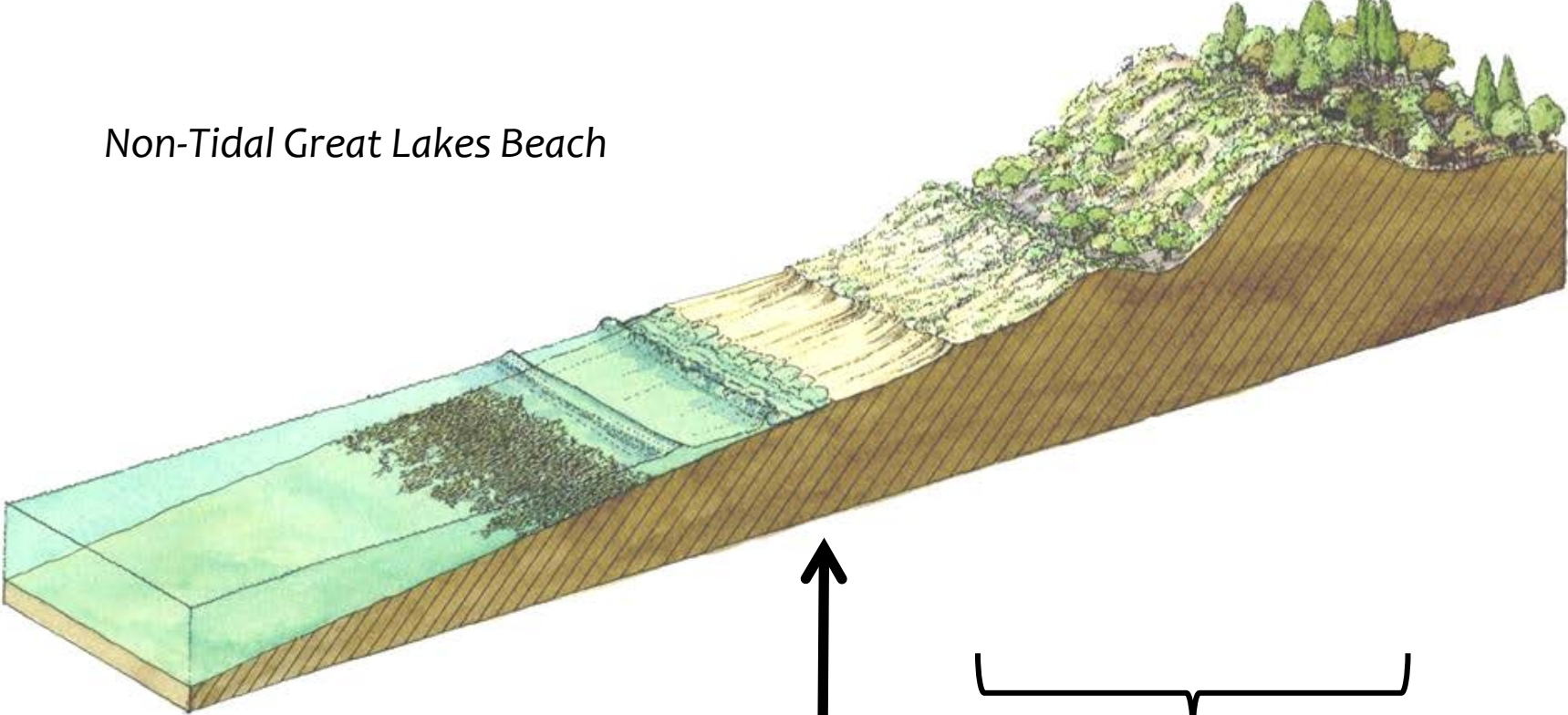
Public Trust Doctrine

Yes – The Public Trust Doctrine has been held to apply to the “inland seas” of the Great Lakes by judicial decree (federal and state)

But, the Great Lakes are not tidal, so...

- * How far up the beach does the public trust interest reach?
- * What happens when the shoreline changes?

Non-Tidal Great Lakes Beach



Submerged Land:
Always owned by the State



Ordinary High Water Mark?

Marking OHW on the Great Lakes

Strong Public Ownership

	Fastland	Dry Sand	Wet Sand	Lake
Indiana New York Wisconsin	Private Ownership →			
		← Public Trust		

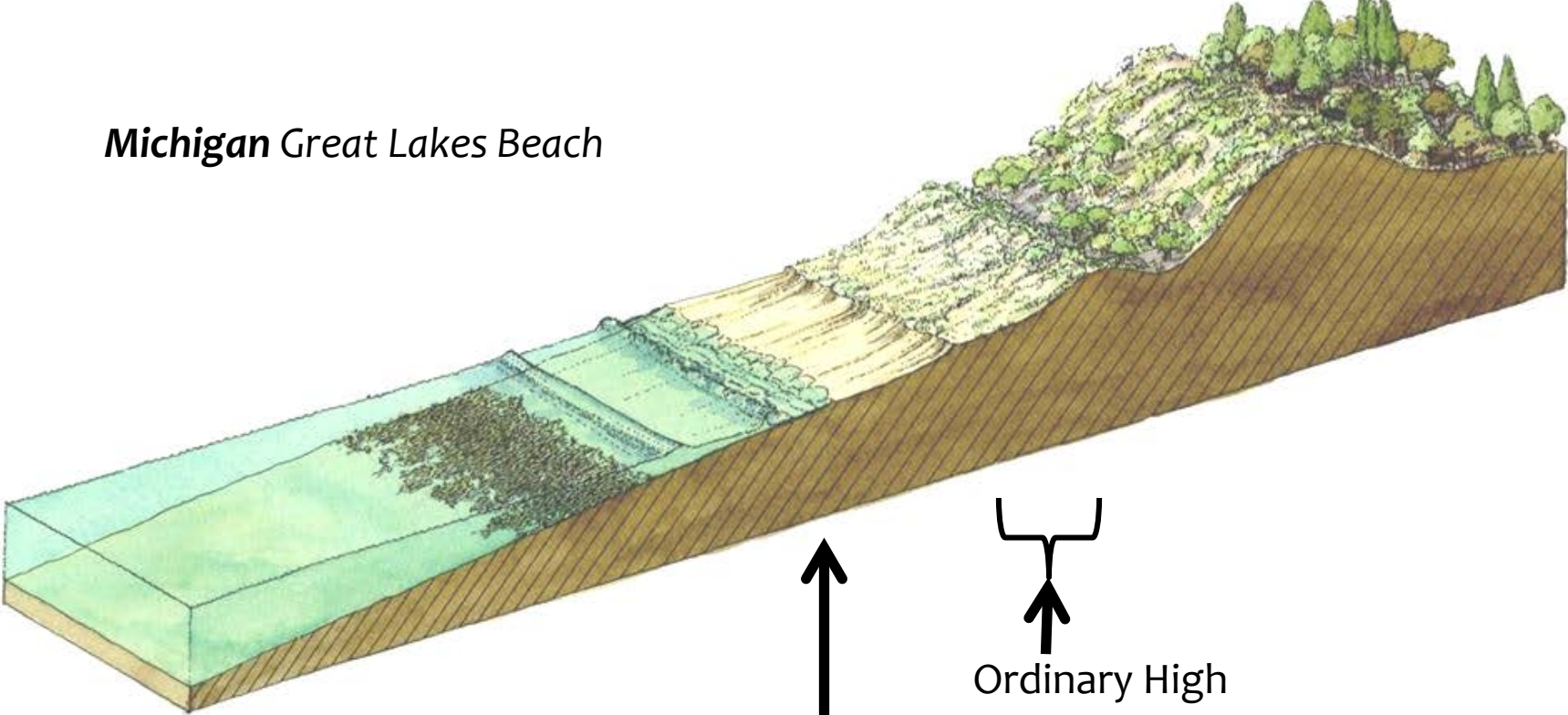
Overlapping Ownership

	Fastland	Dry Sand	Wet Sand	Lake
Michigan Illinois Minnesota Pennsylvania	Private Ownership →			
		← Public Trust		

Strong Private Ownership

	Fastland	Dry Sand	Wet Sand	Lake
Ohio	Private Ownership →			
				← Public Trust

Michigan Great Lakes Beach



Submerged Land:
Always owned by the State

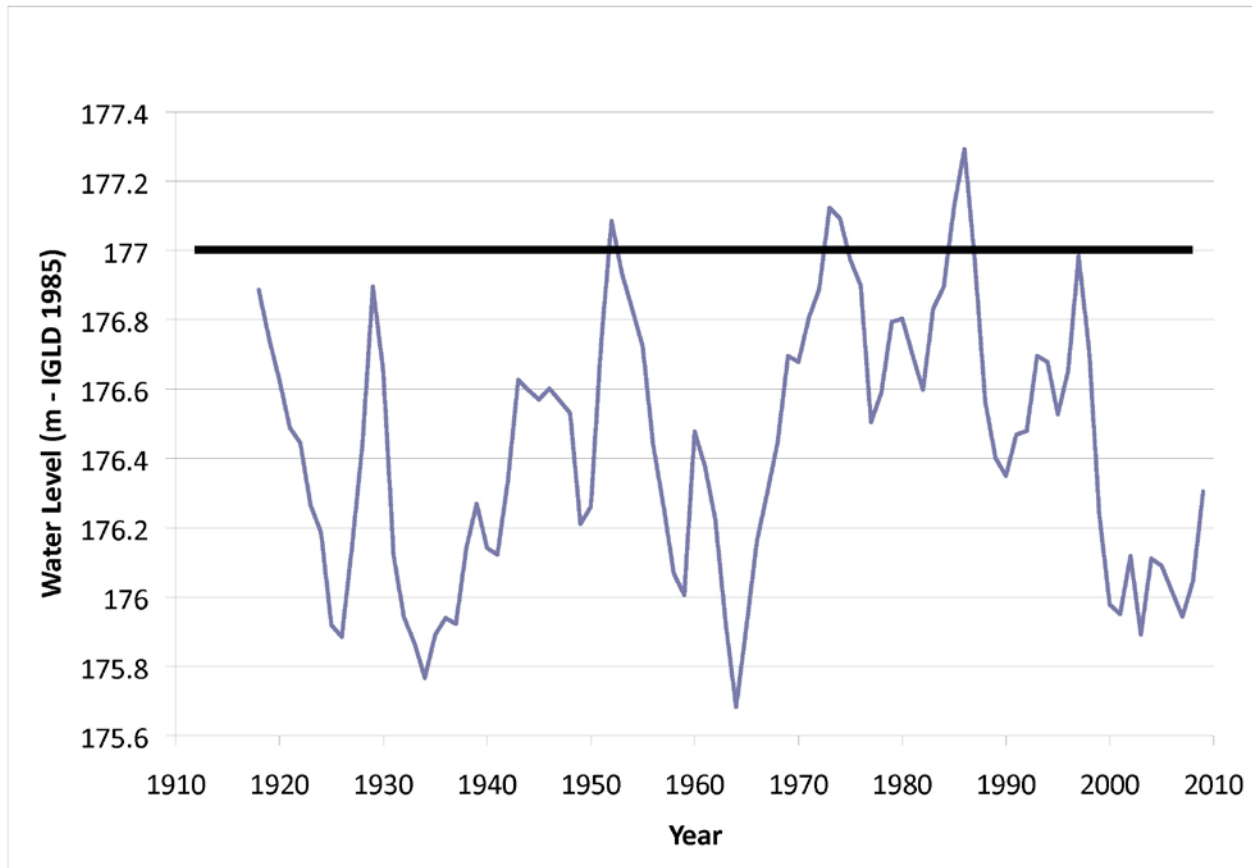
Ordinary High
Water Mark?

“Public Trust Beach”
-- Right of public use
-- Duty to not impair

What happens when shorelines move?

- * General Rule – Submerged Lands:
 - * Accretion/Erosion – Moveable freehold
 - * Avulsion – Property lines remain unchanged
- * General Rule – Public Trust:
 - * Same (?)
- * General Rule – Public Trust Boundaries on Great Lakes:
 - * **Michigan:** Presumably the same, but ...

Lake Michigan Water Levels

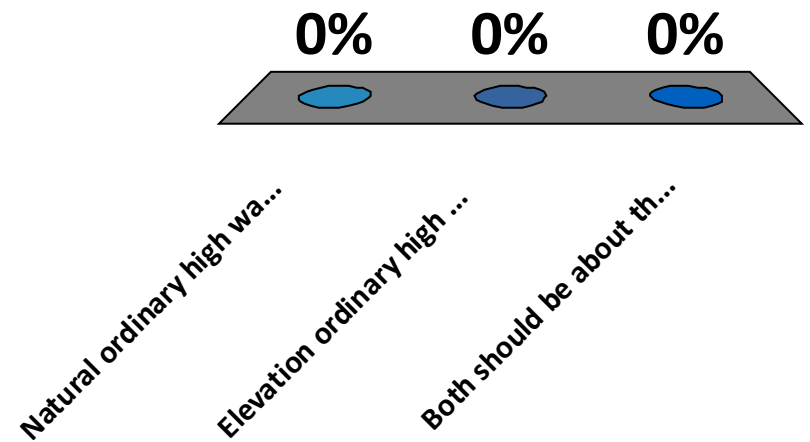


Marking OHW on a Michigan Great Lakes Shoreline

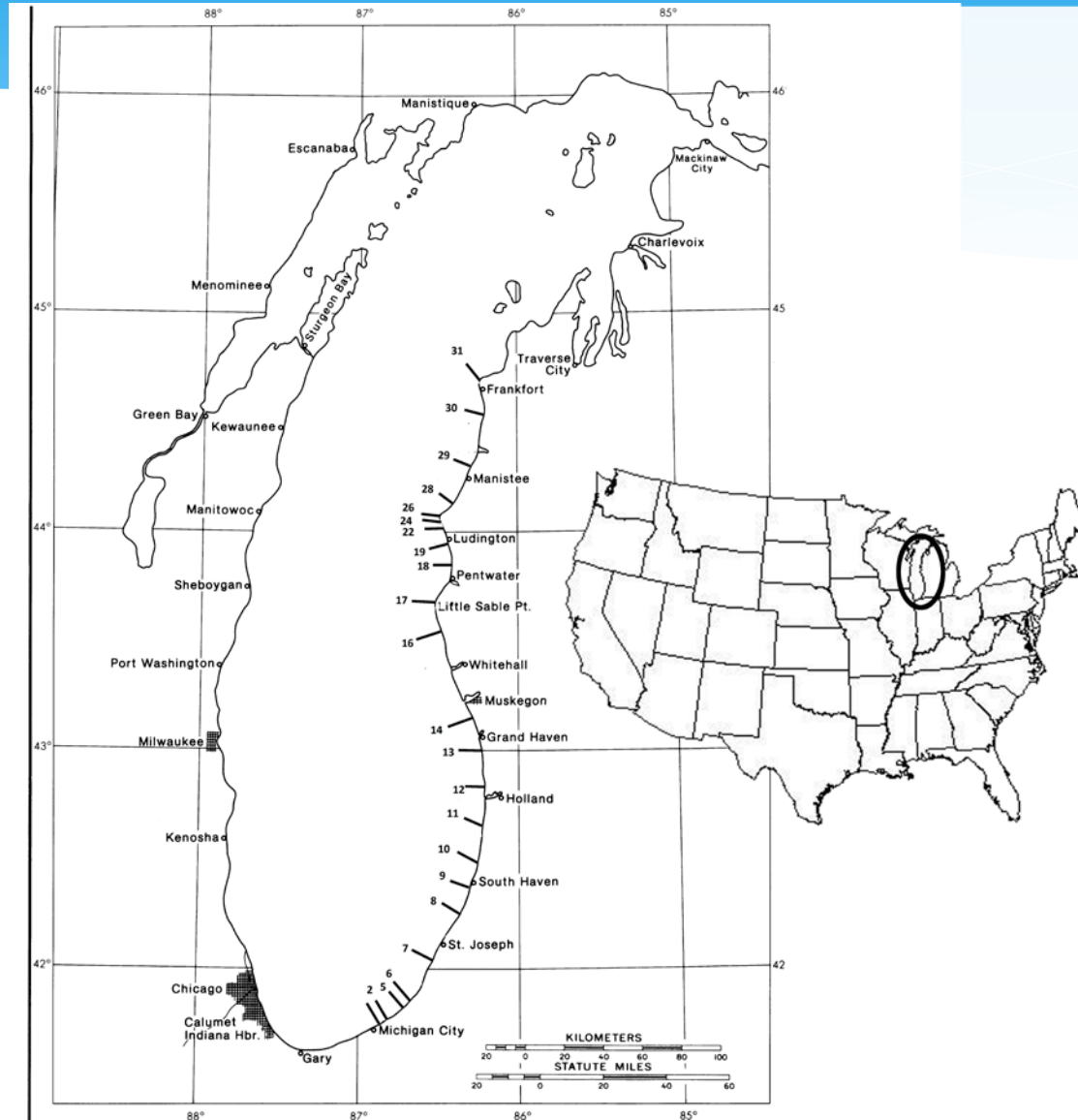
- * “Natural OHWM”: Physical evidence of the presence of water (MI Supreme Court 2005)
- * “Elevation OHWM”: Intersection of a specified IGLD elevation level with the shore (GLSLA 1955, 1968)

Question: Which mark is more stable – and thus provides greater certainty – over time:

- A. Natural ordinary high water mark
- B. Elevation ordinary high water mark
- C. Both should be about the same

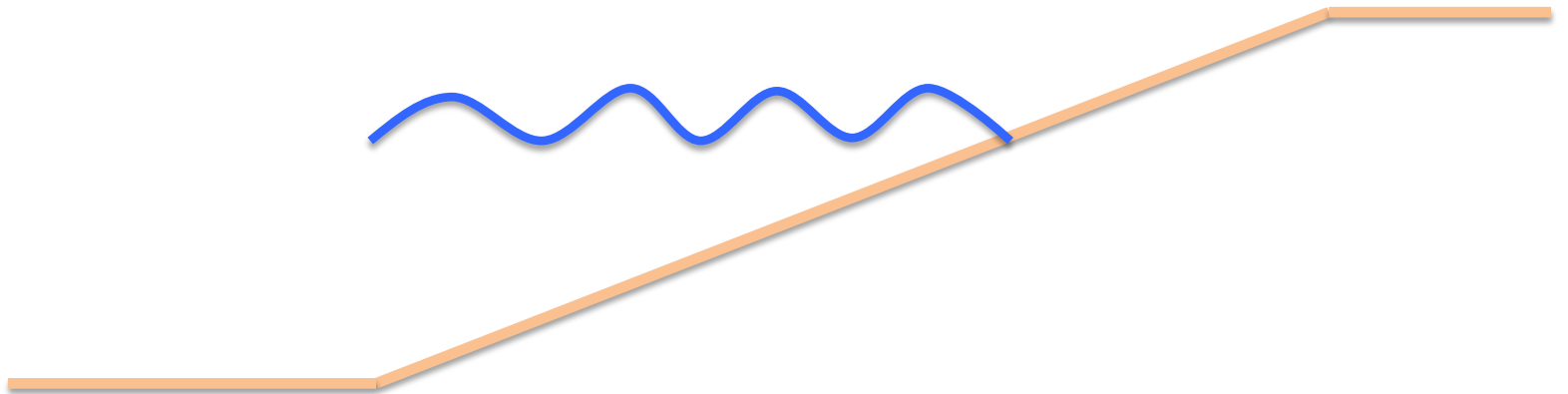


Meadows and Meadows Lake MI Study Sites



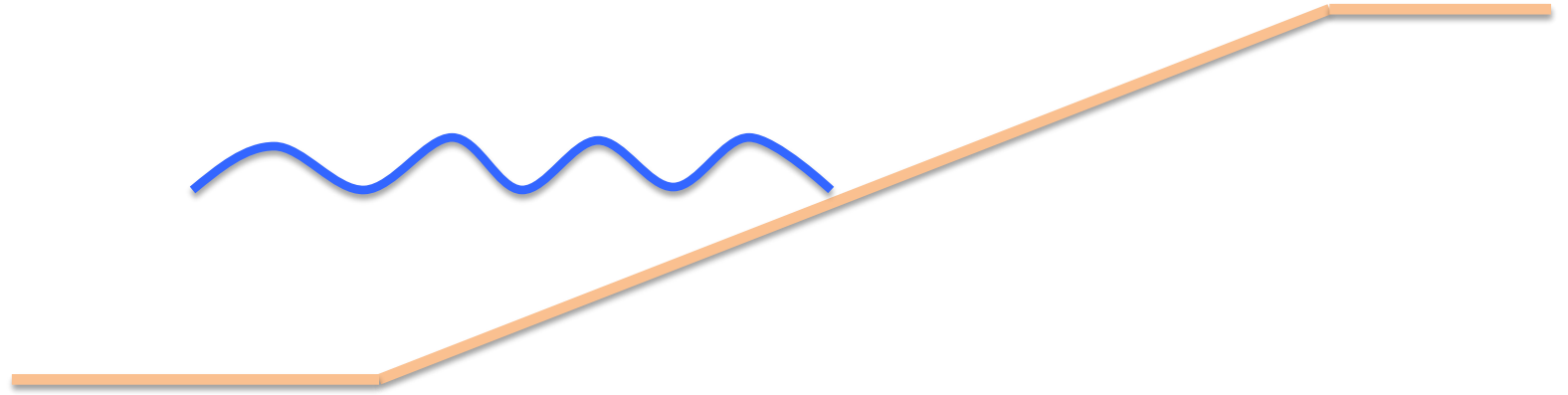
Hypothetically

1



2

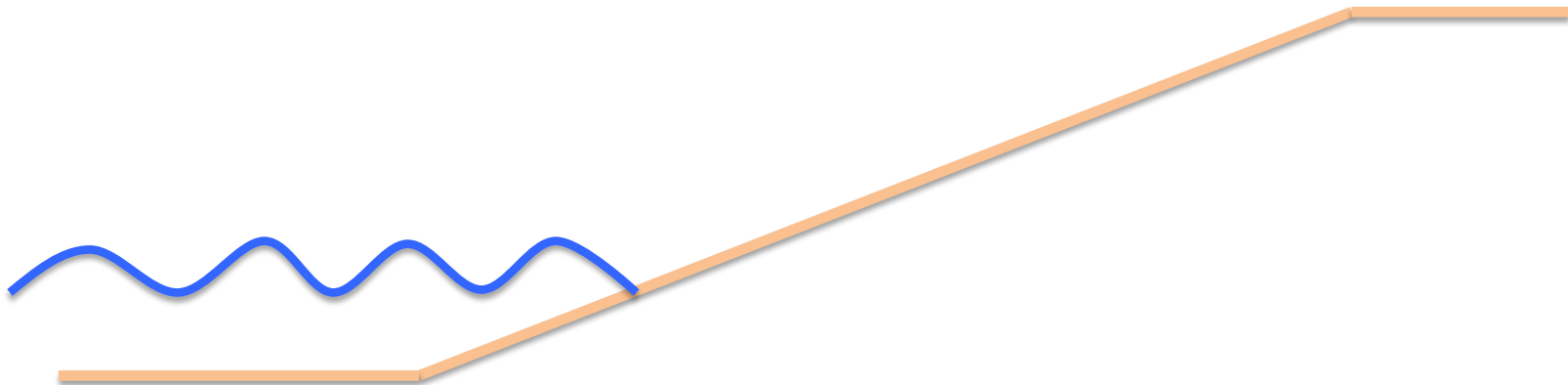
1



3

2

1

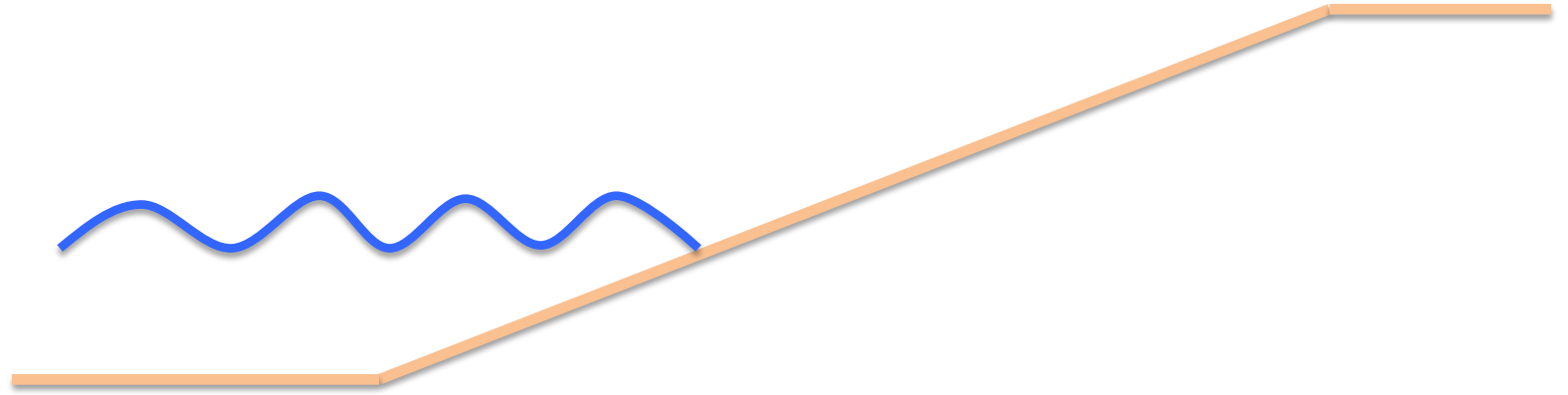


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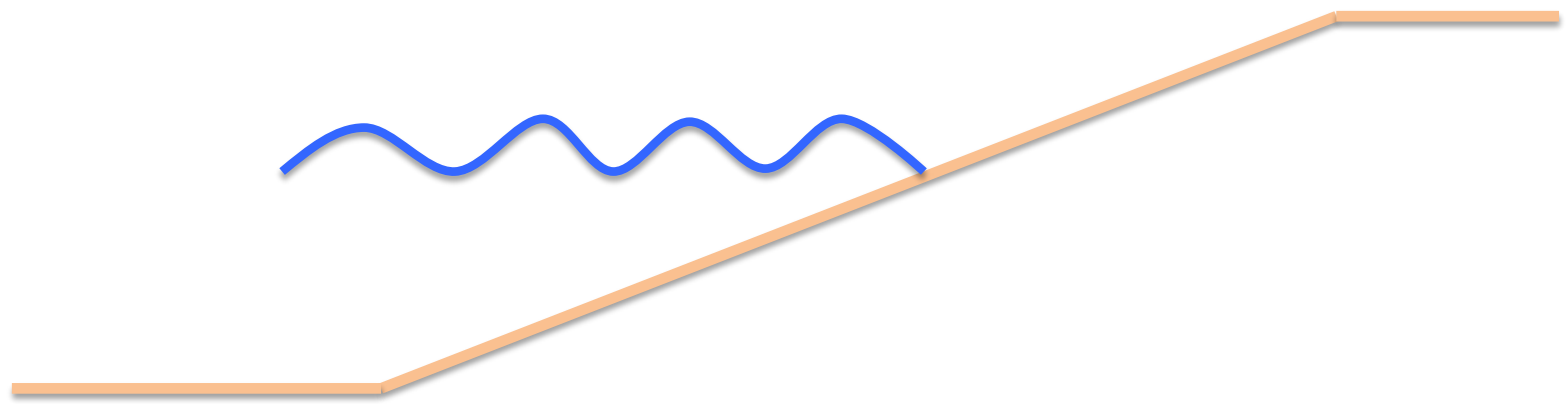
4

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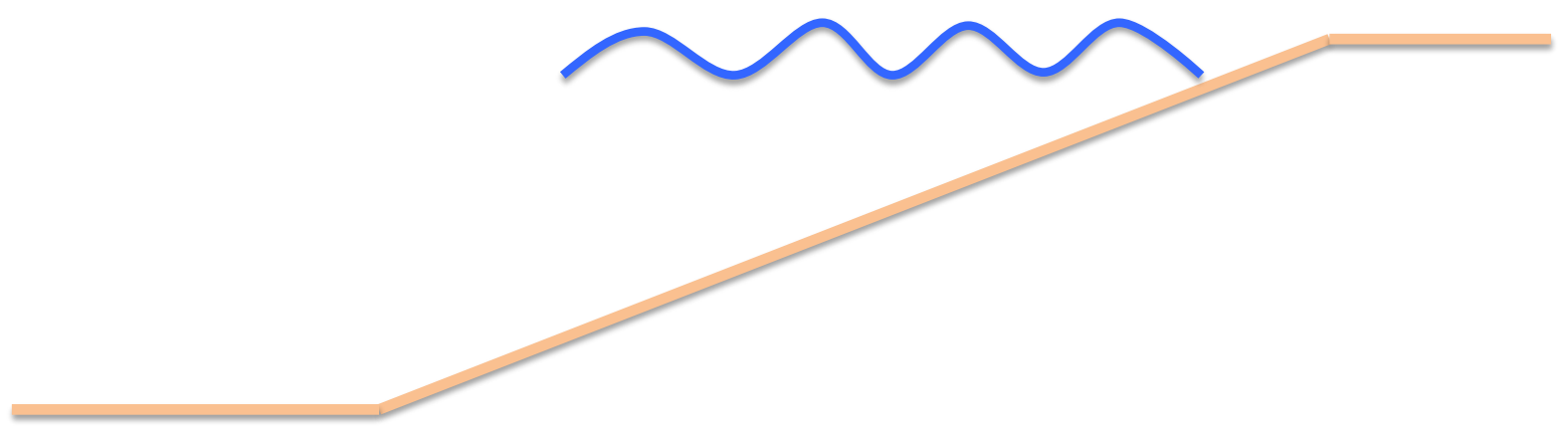
1



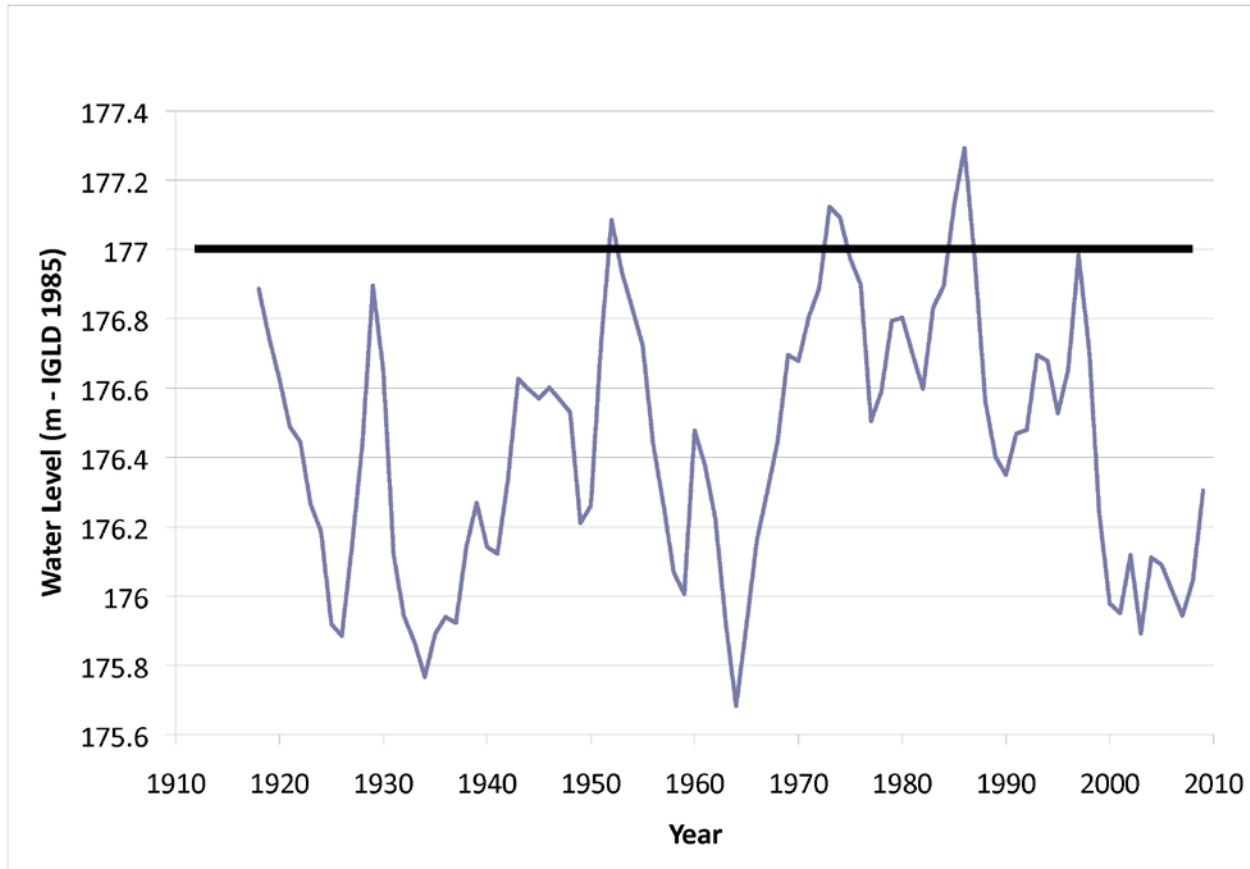
3 4 2 5 1

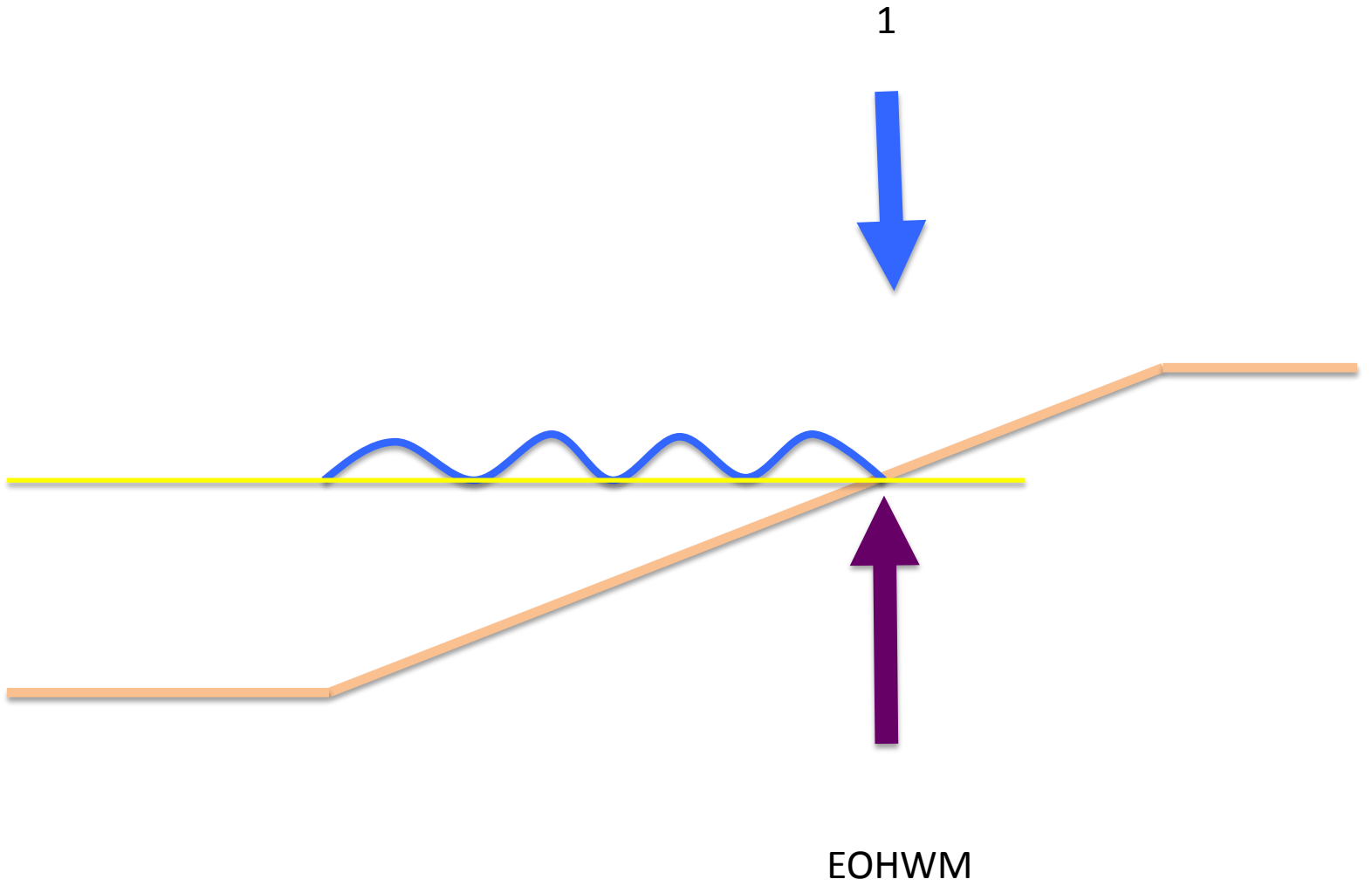


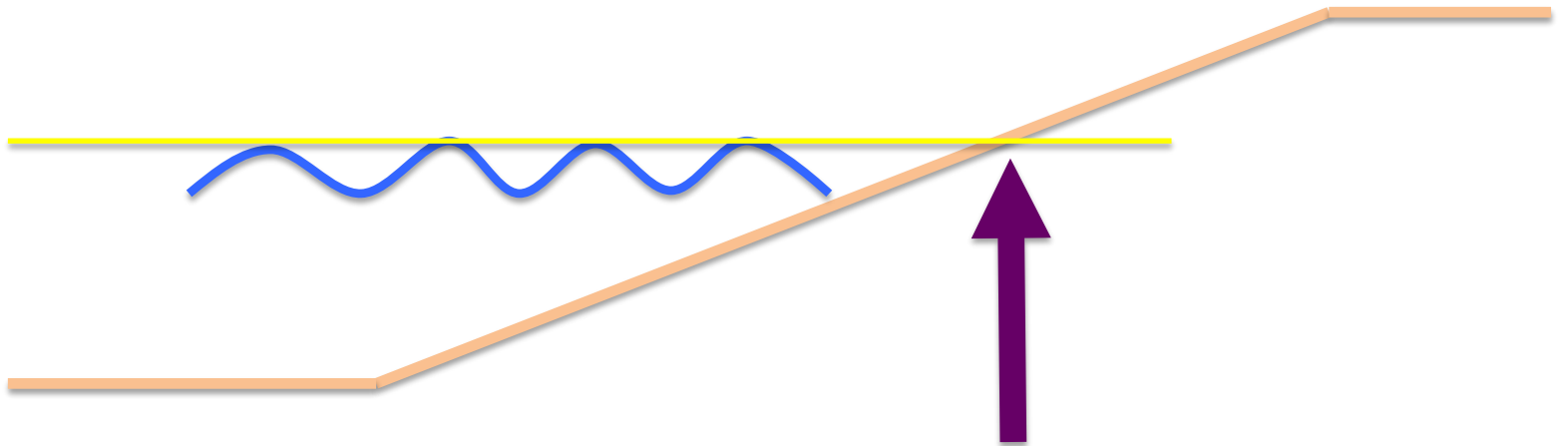
3 4 2 5 1 6



Lake Michigan Water Levels

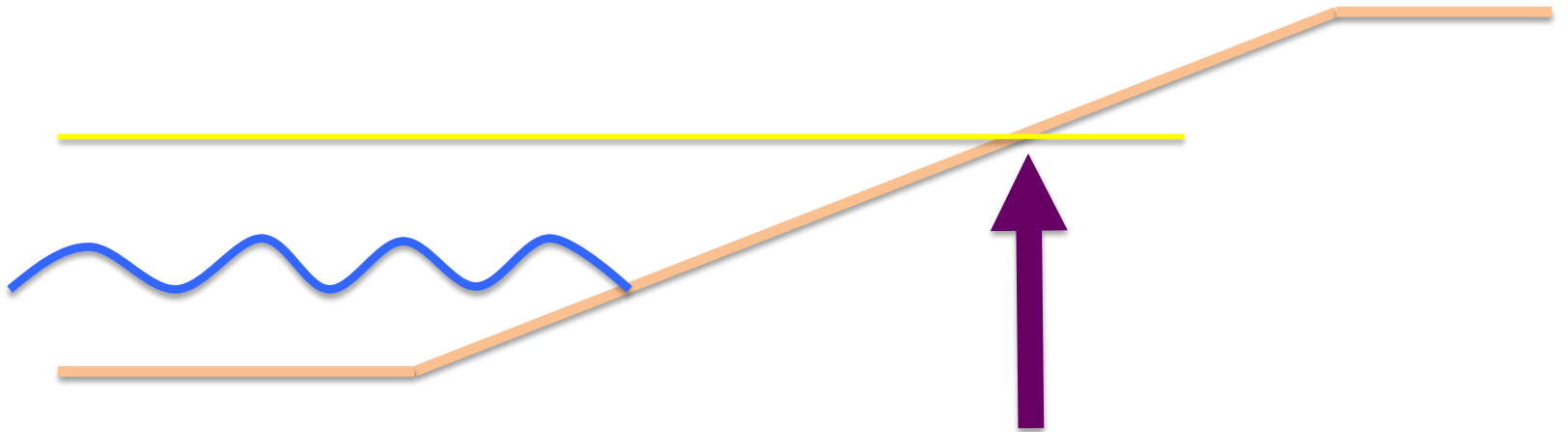




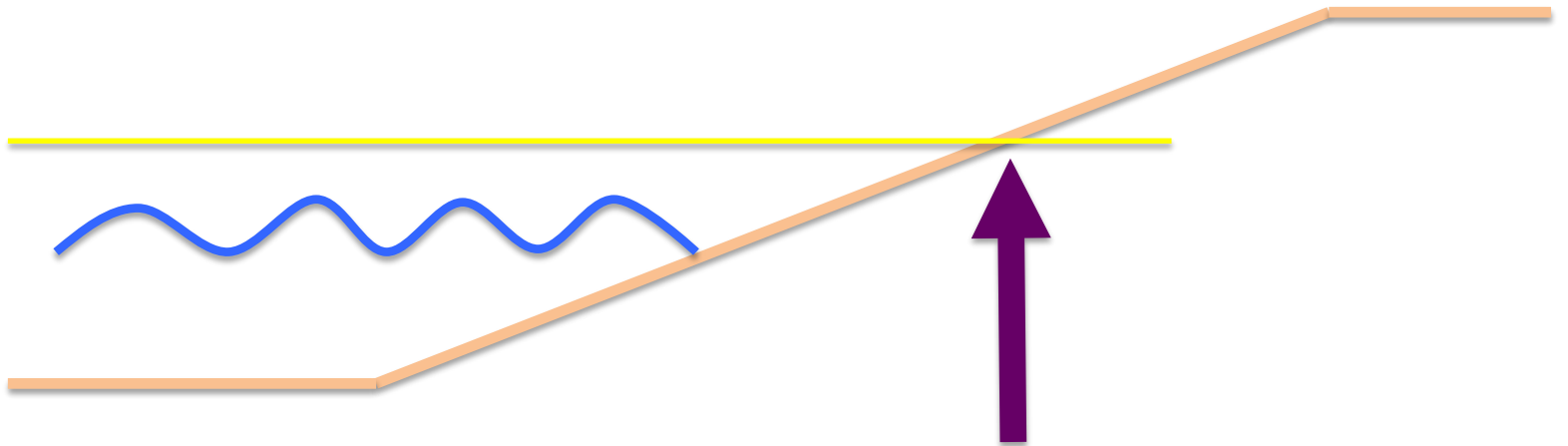


EOHWM

3

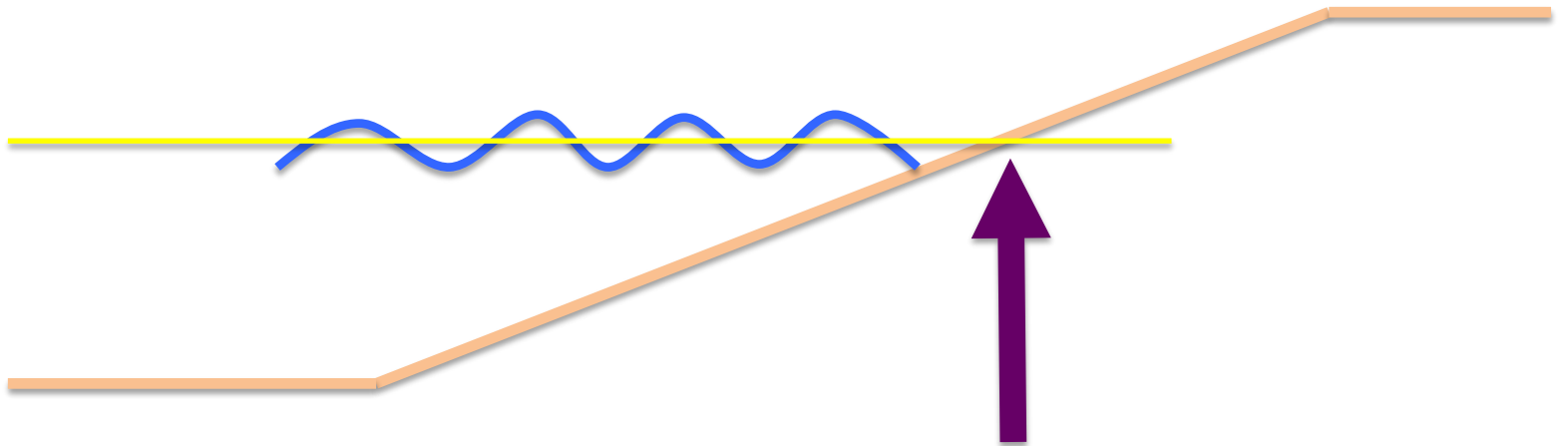


EOHWM

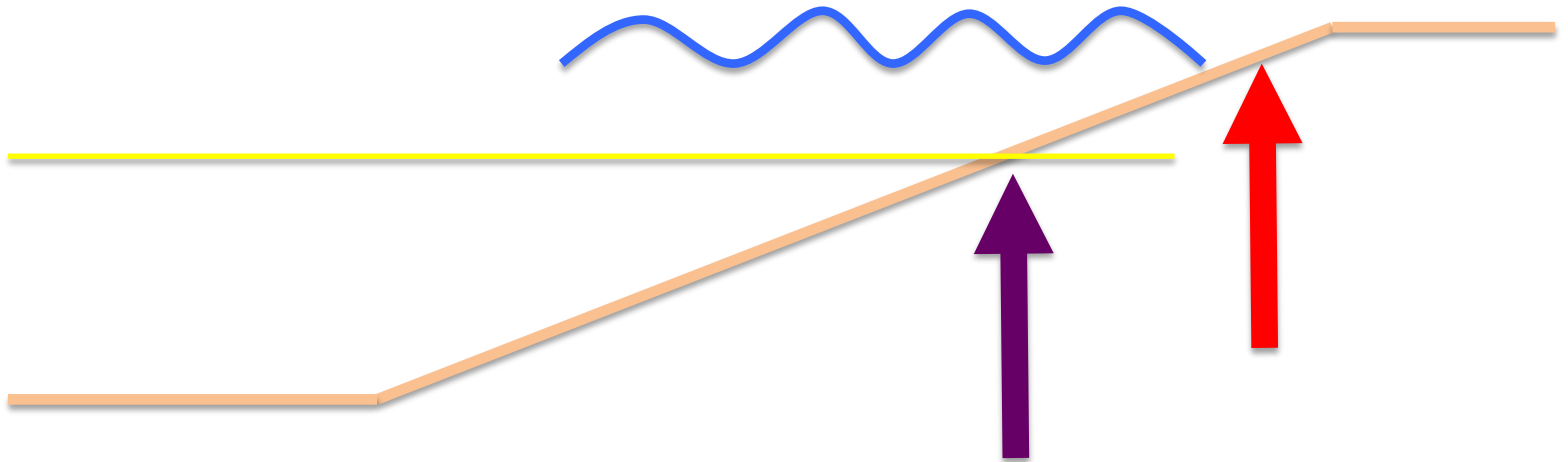


EOHWM

5

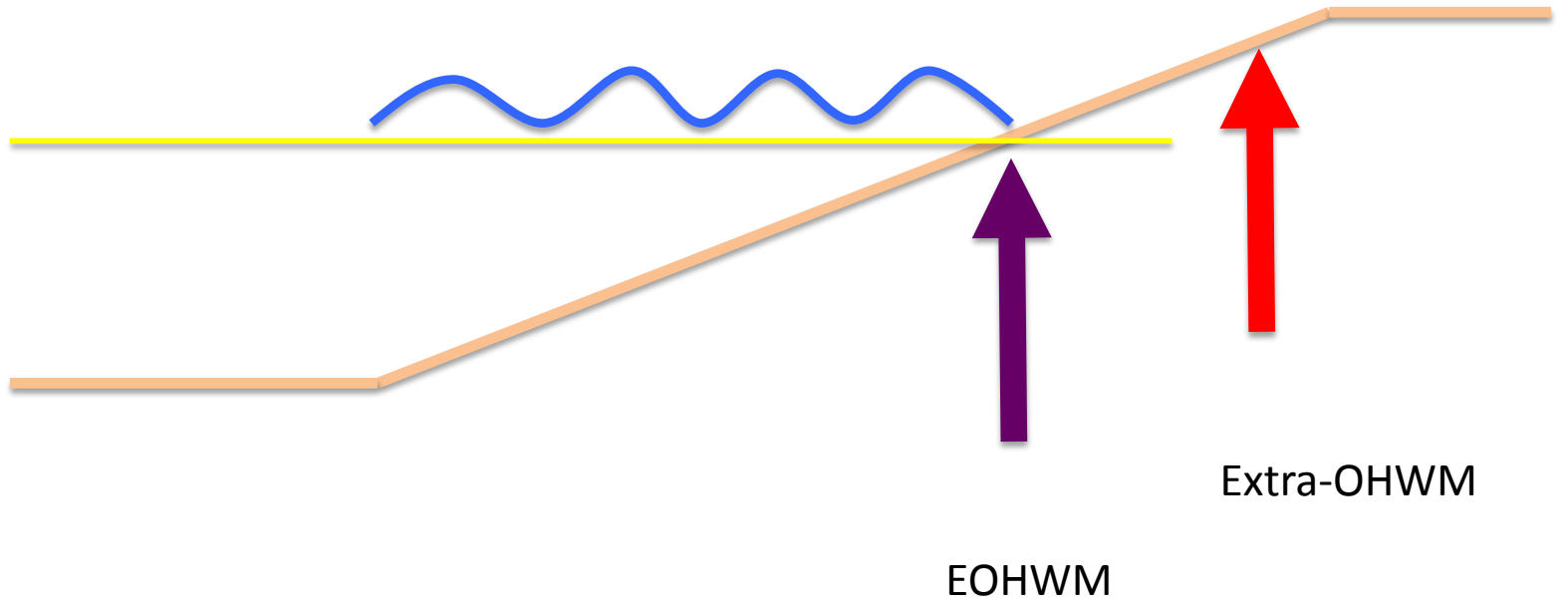


EOHWM



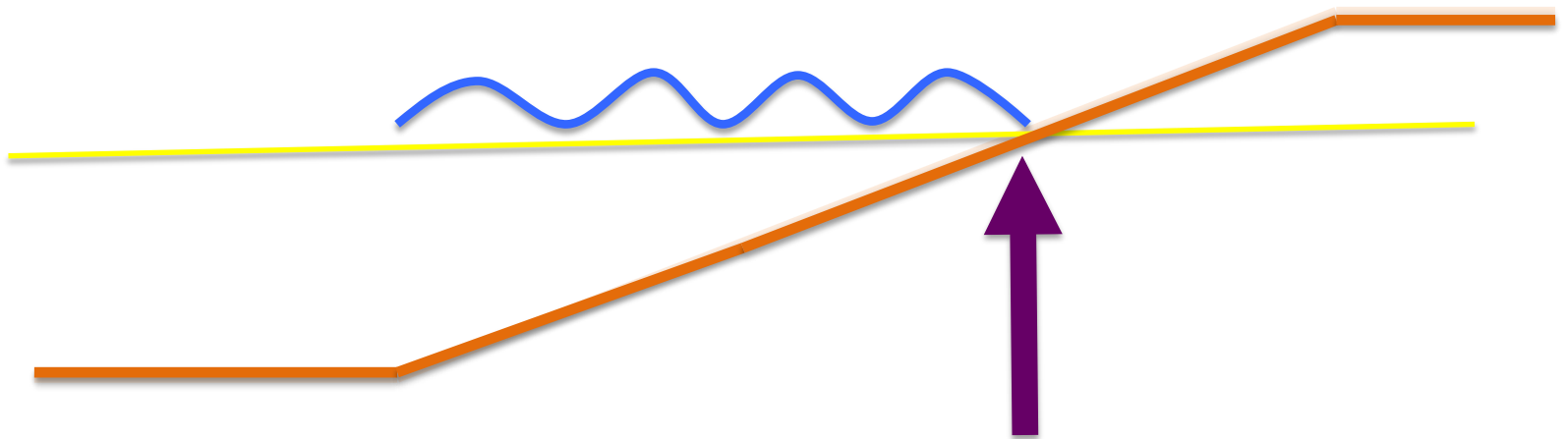
EOHWM

Extra-OHWM

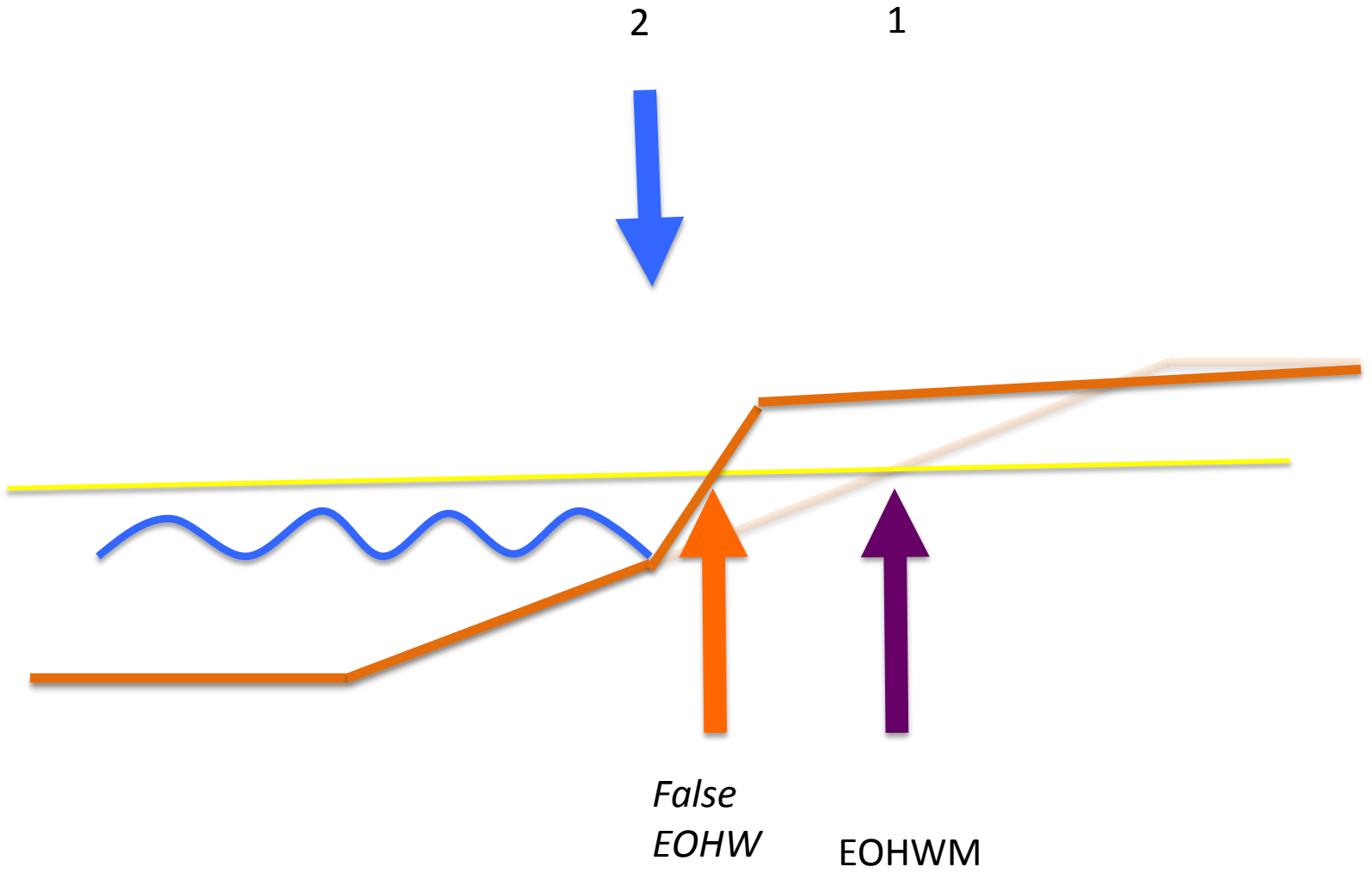


In Reality

1



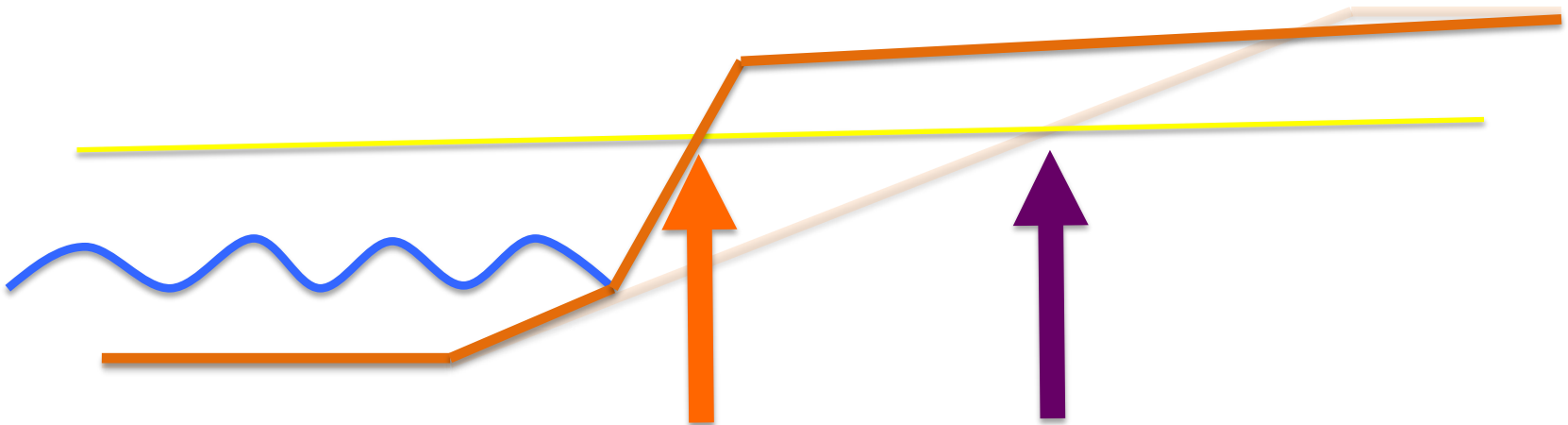
EOHWM



3

2

1



*False
EOHW*

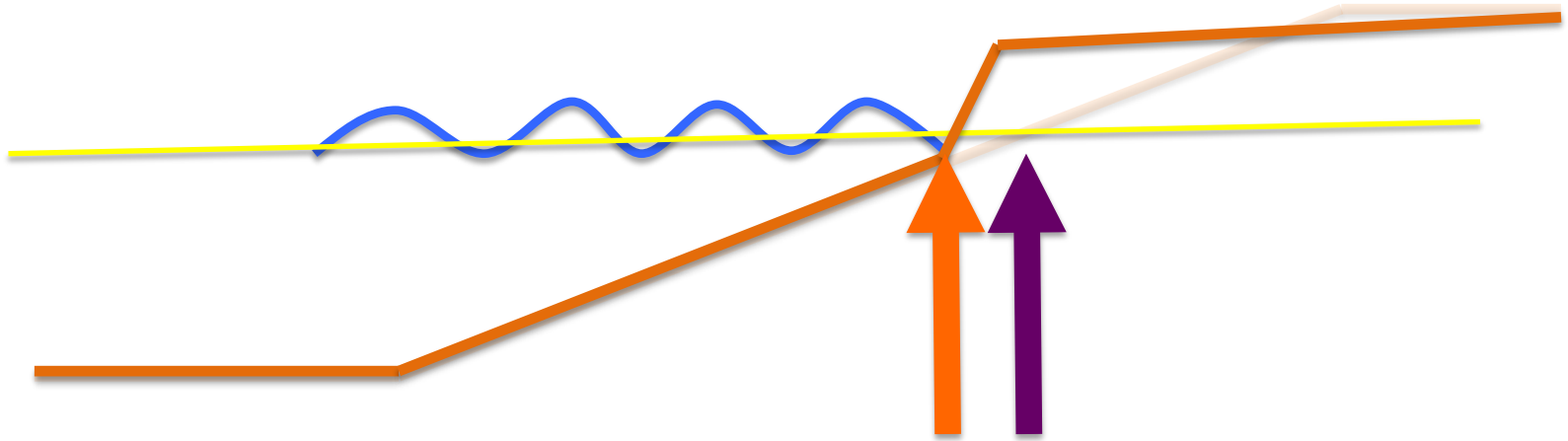
EOHWM

3

2

4

1



*False
EOHW*

EOHWM

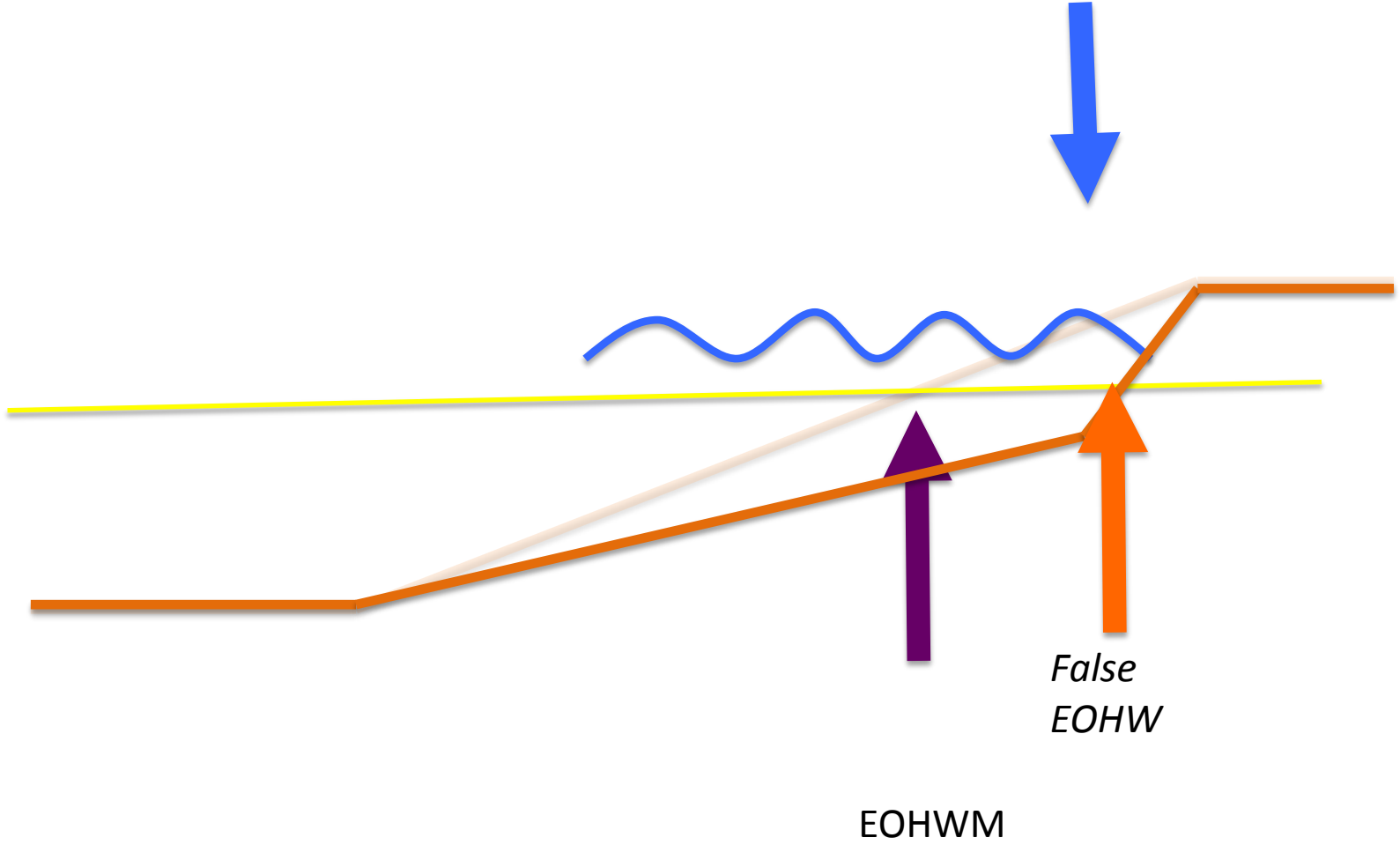
3

2

4

1

5



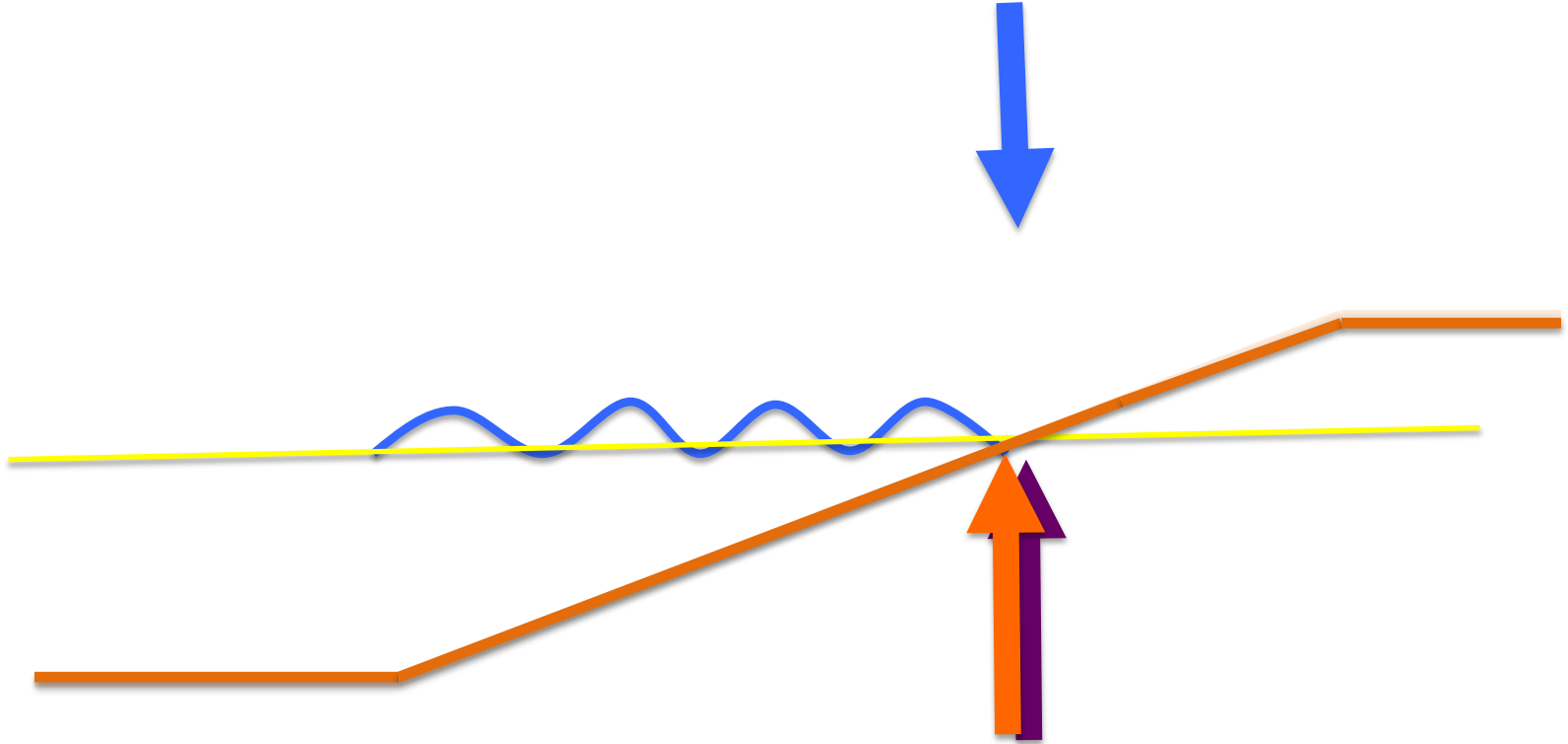
3

2

4

6 1

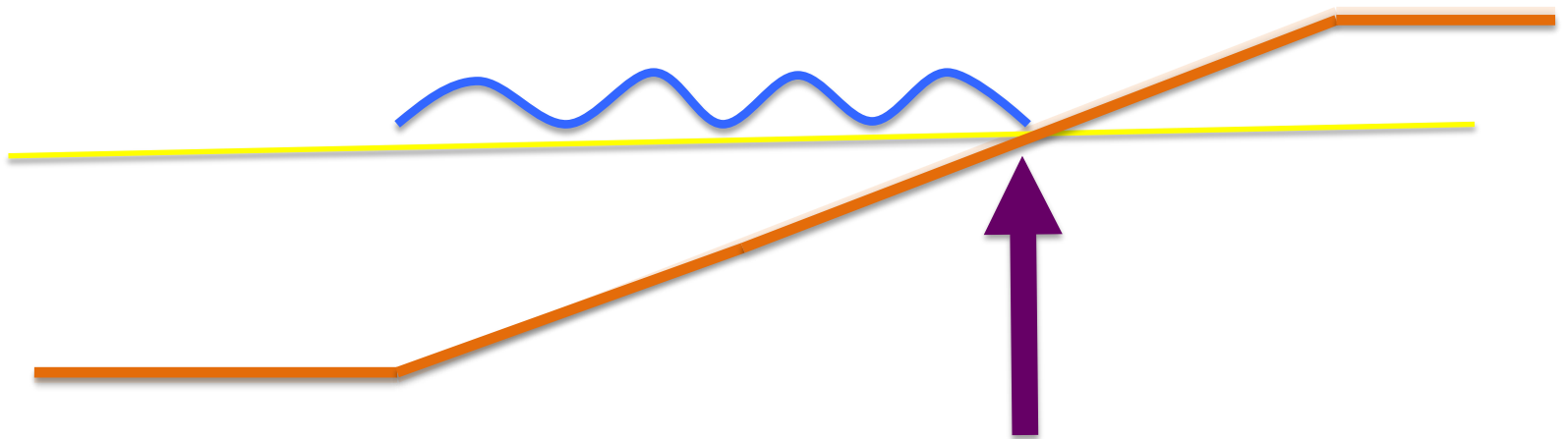
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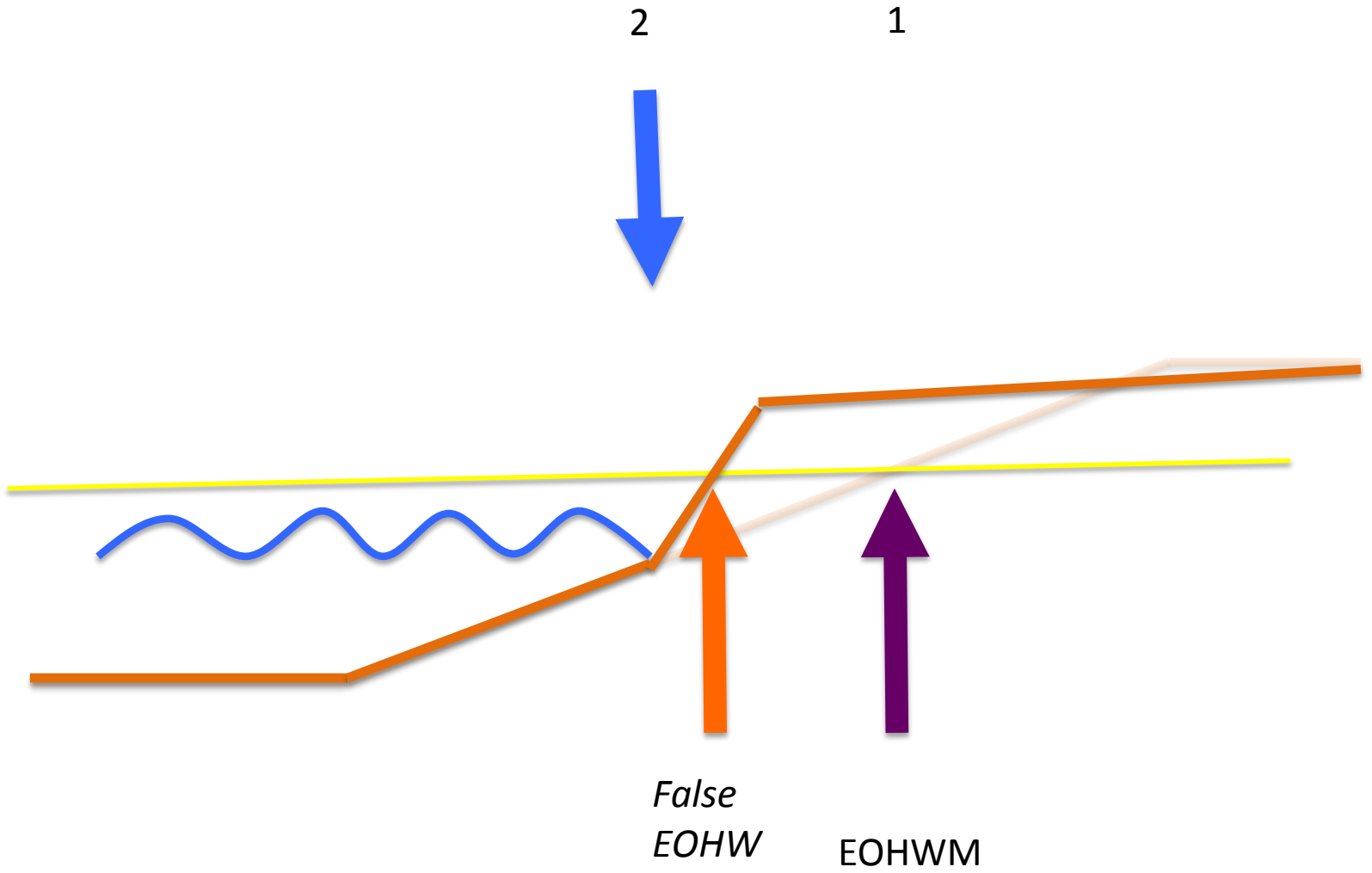
EOHWM

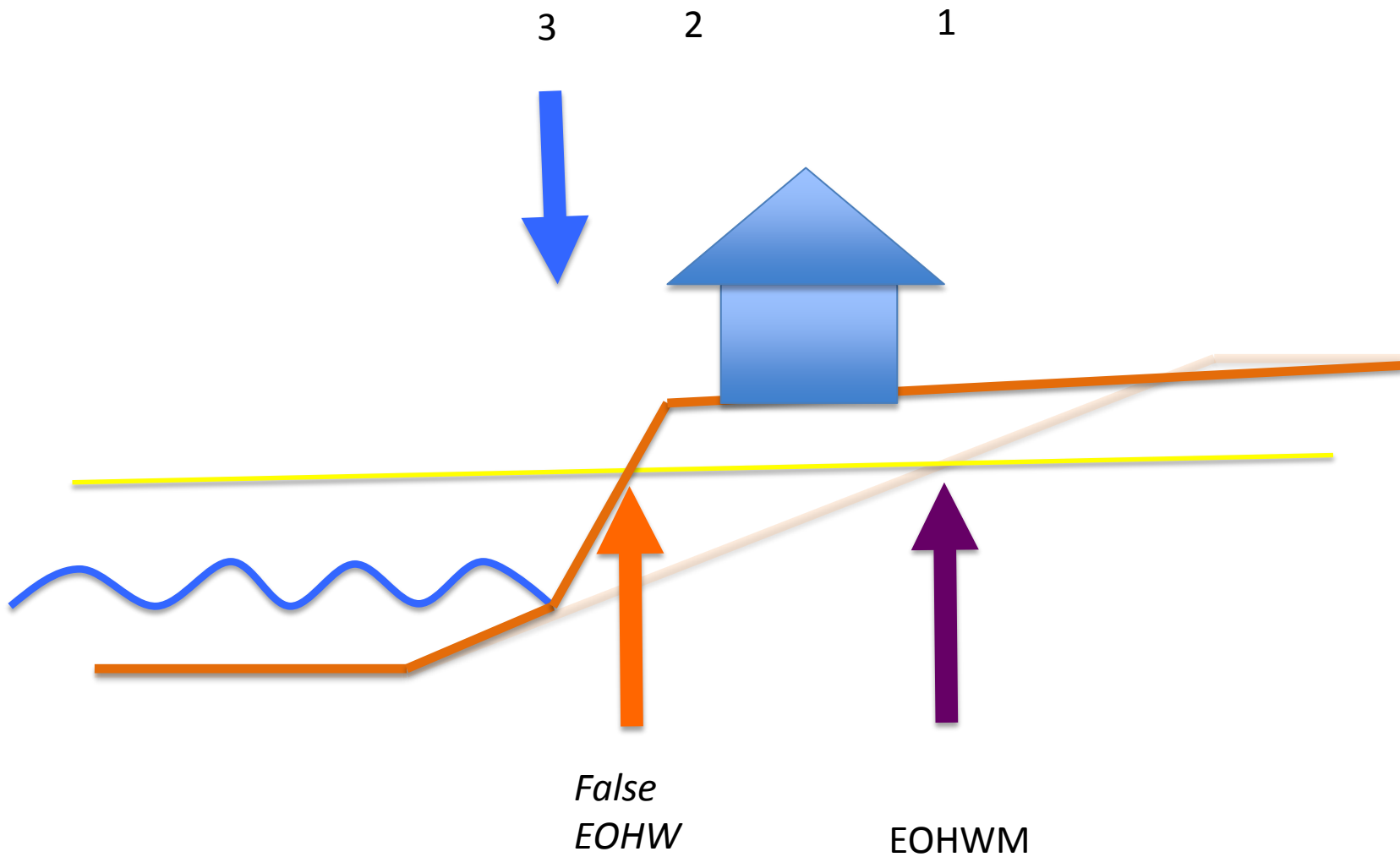
OR, In Reality

1

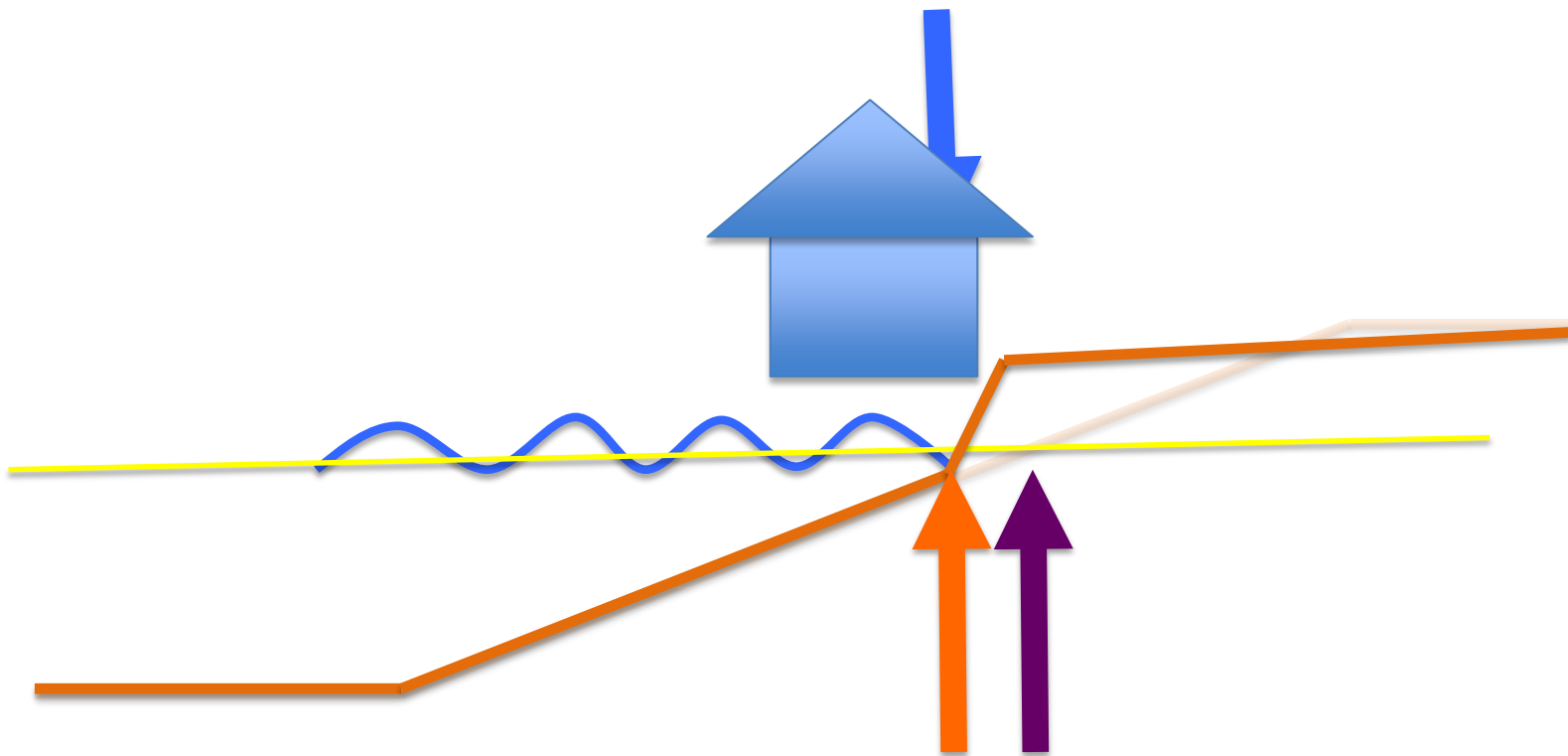


EOHWM



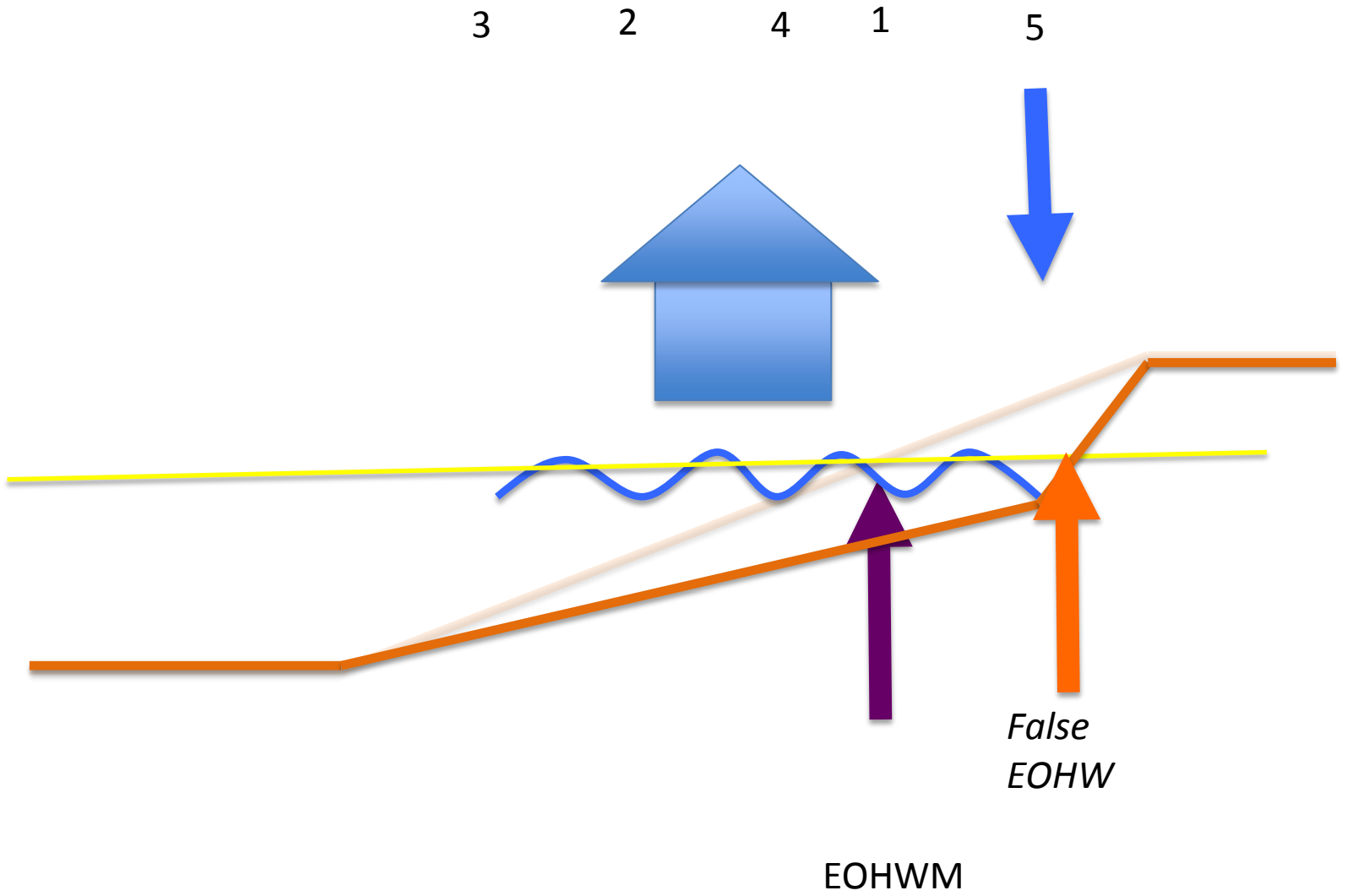


3 2 4 1



*False
EOHW*

EOHWM



3

2

4

6 1

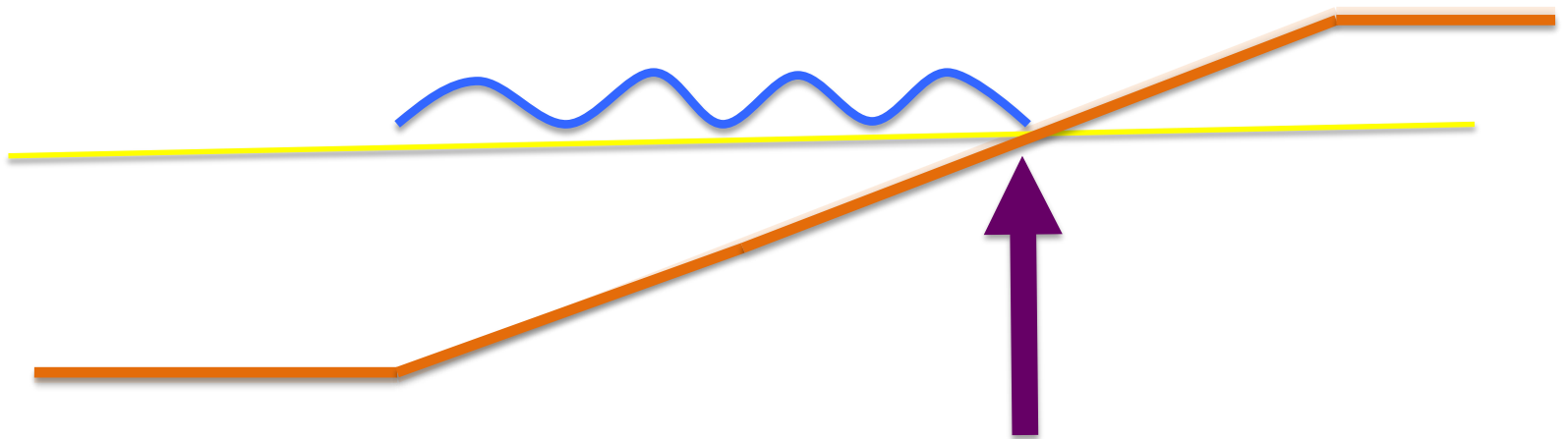
5



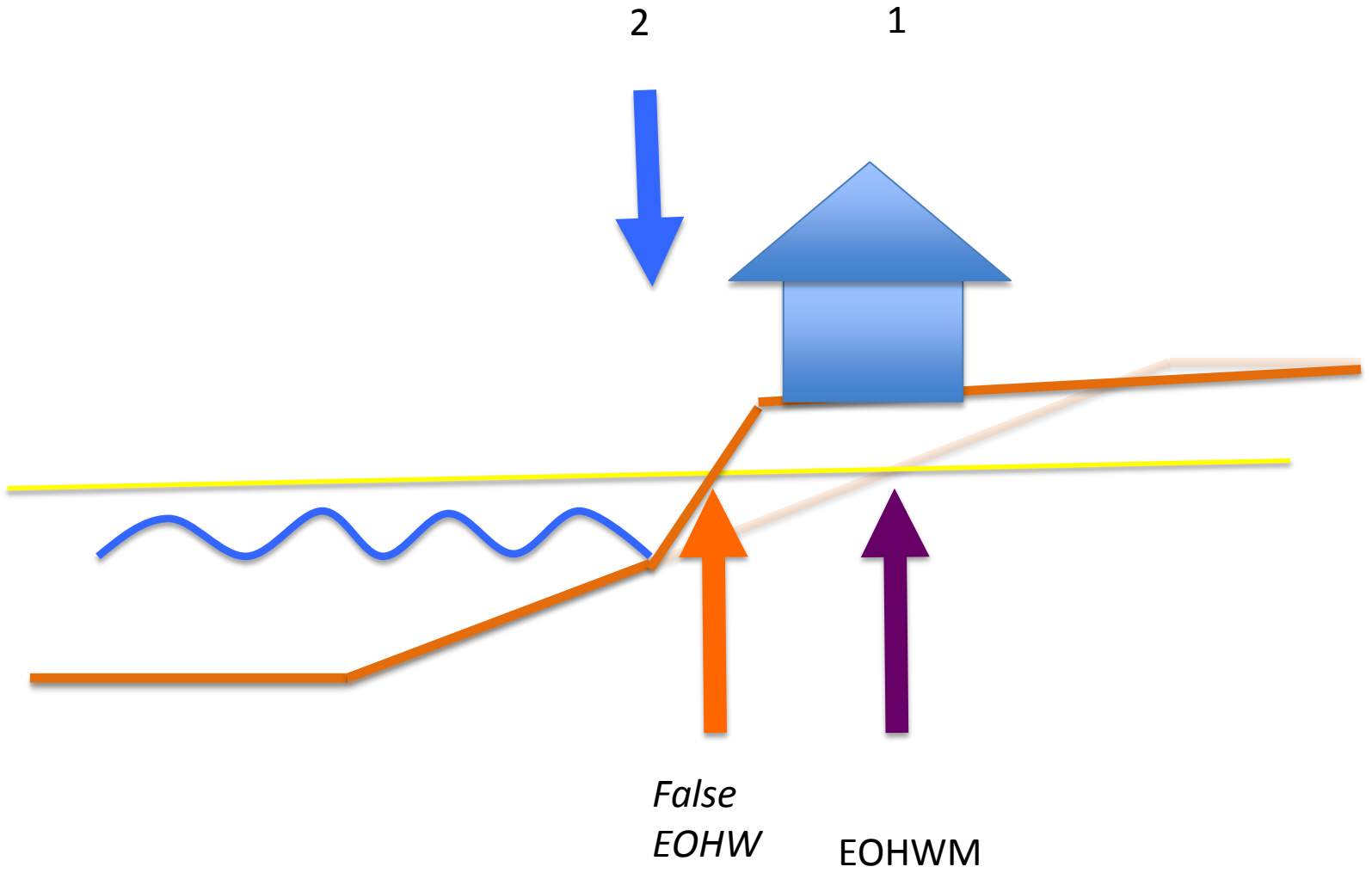
EOHWM

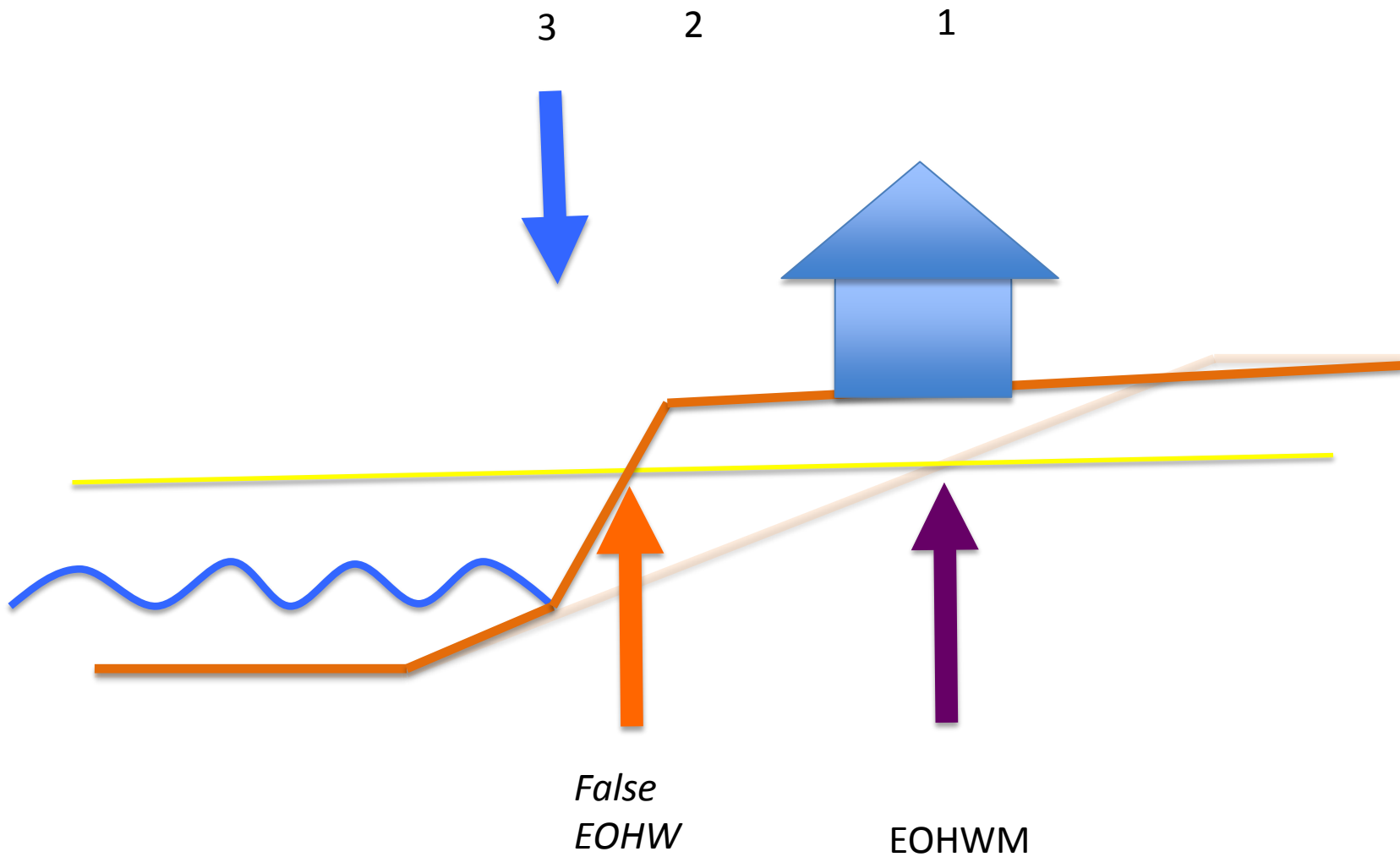
OR, In Reality

1

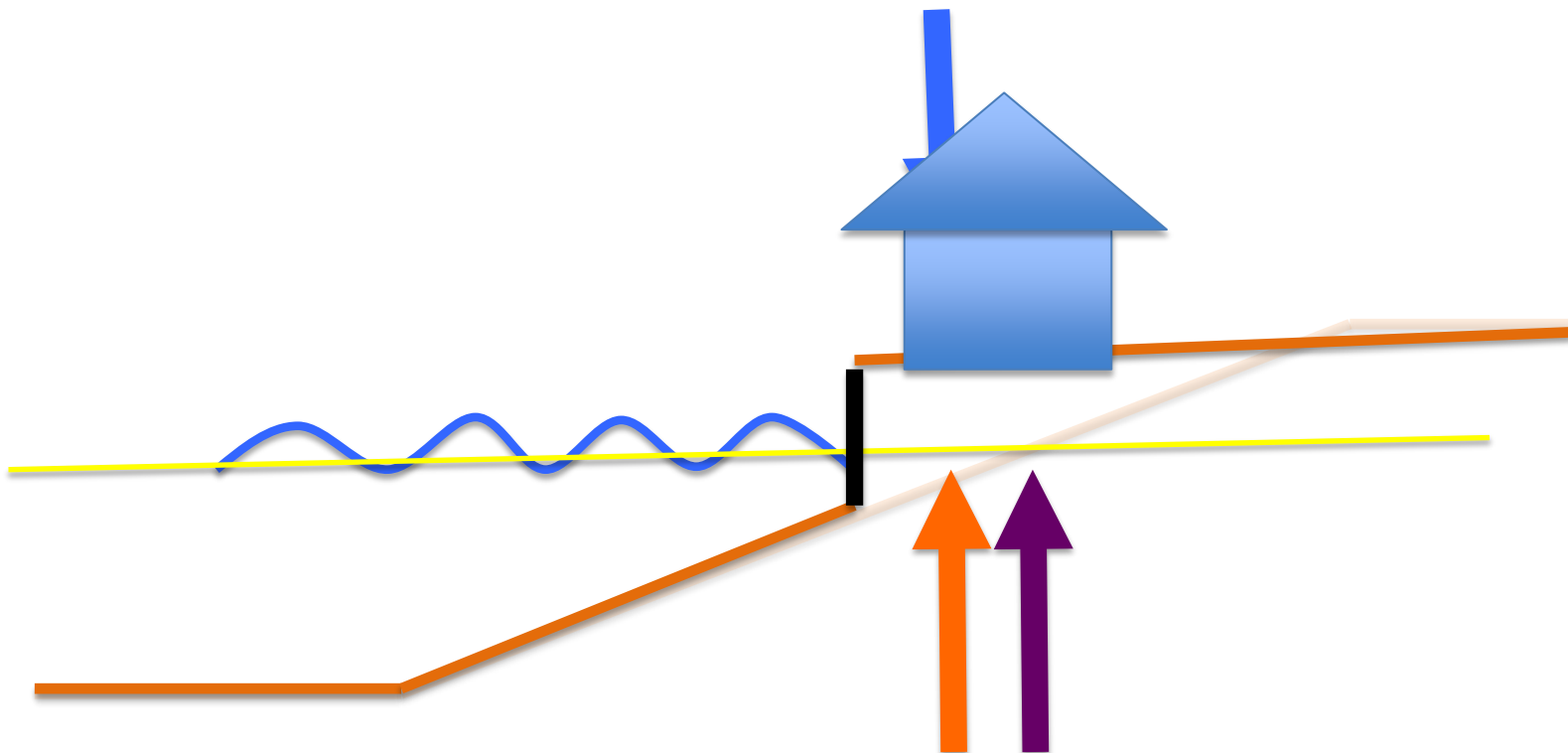


EOHWM



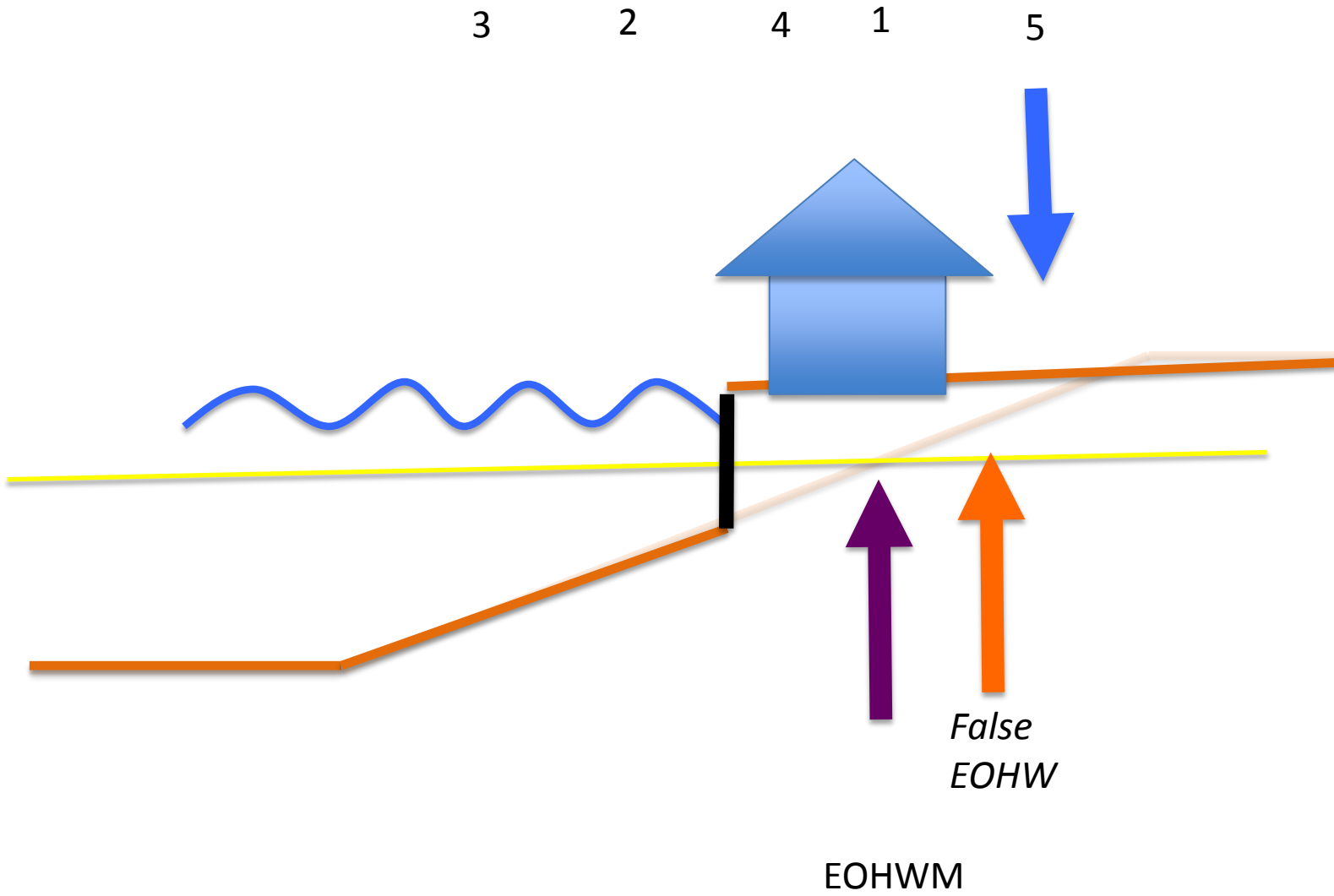


3 2 4 1



*False
EOHW*

EOHWM



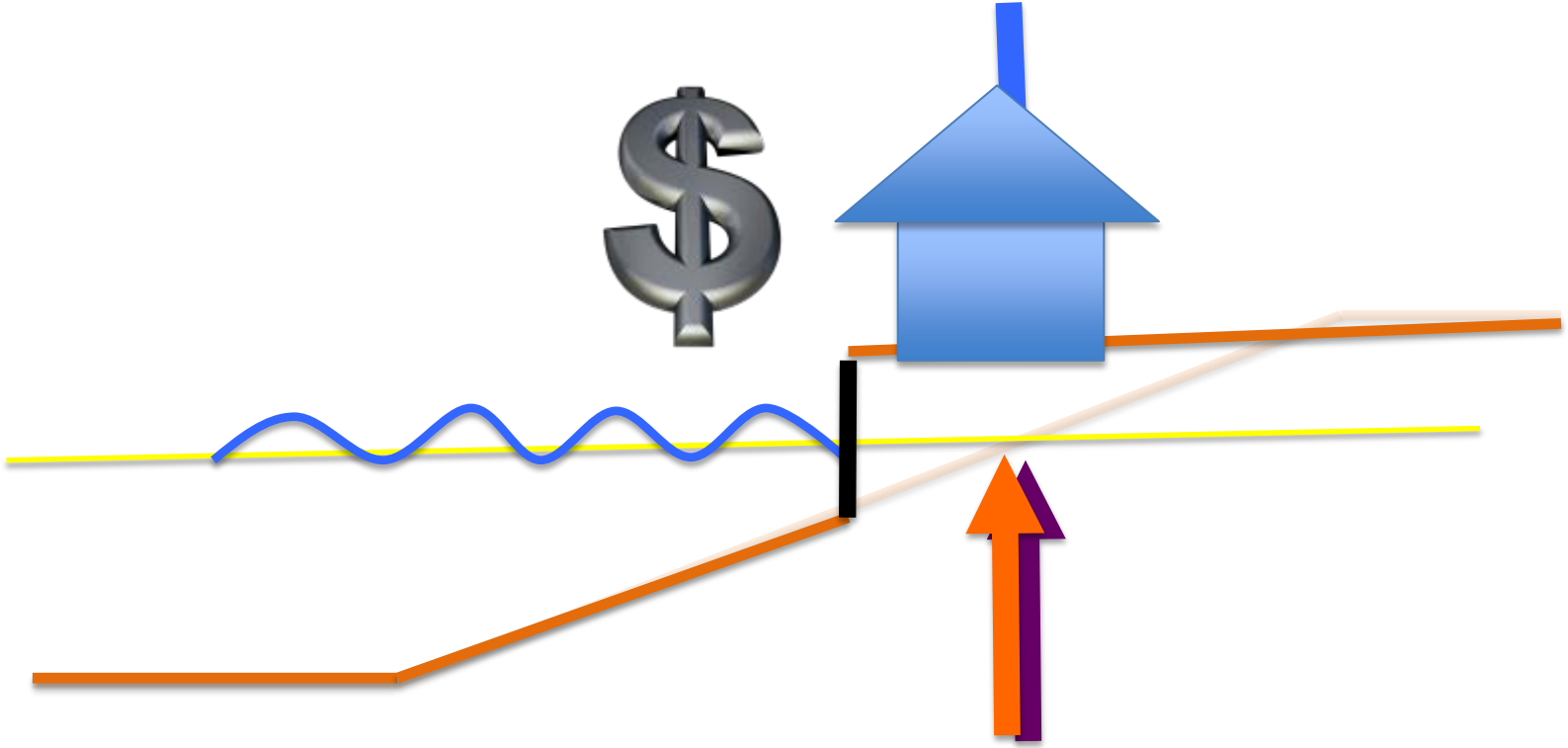
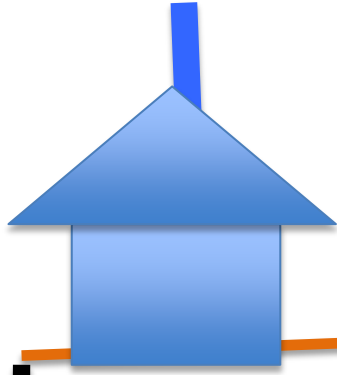
3

2

4

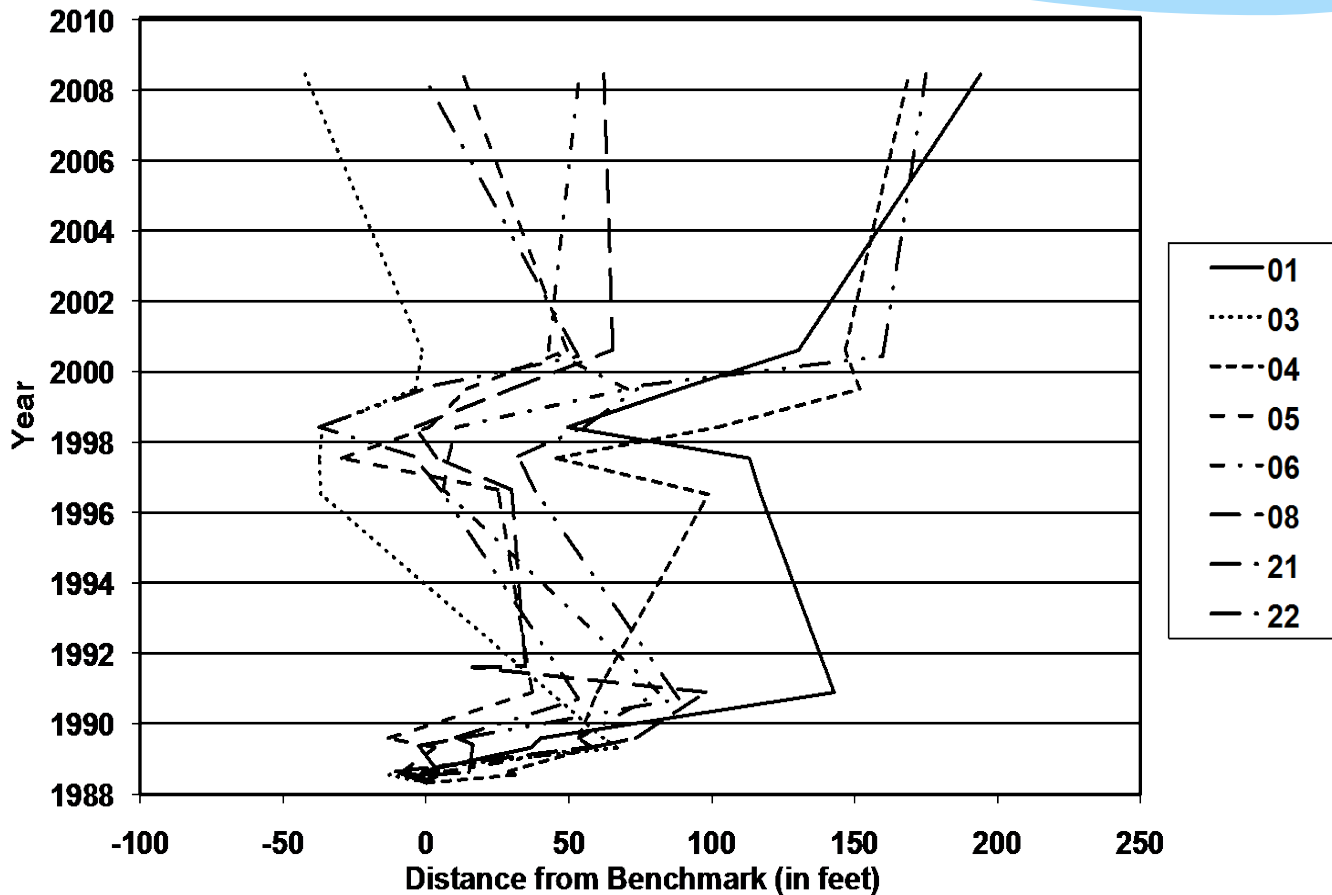
6 1

5

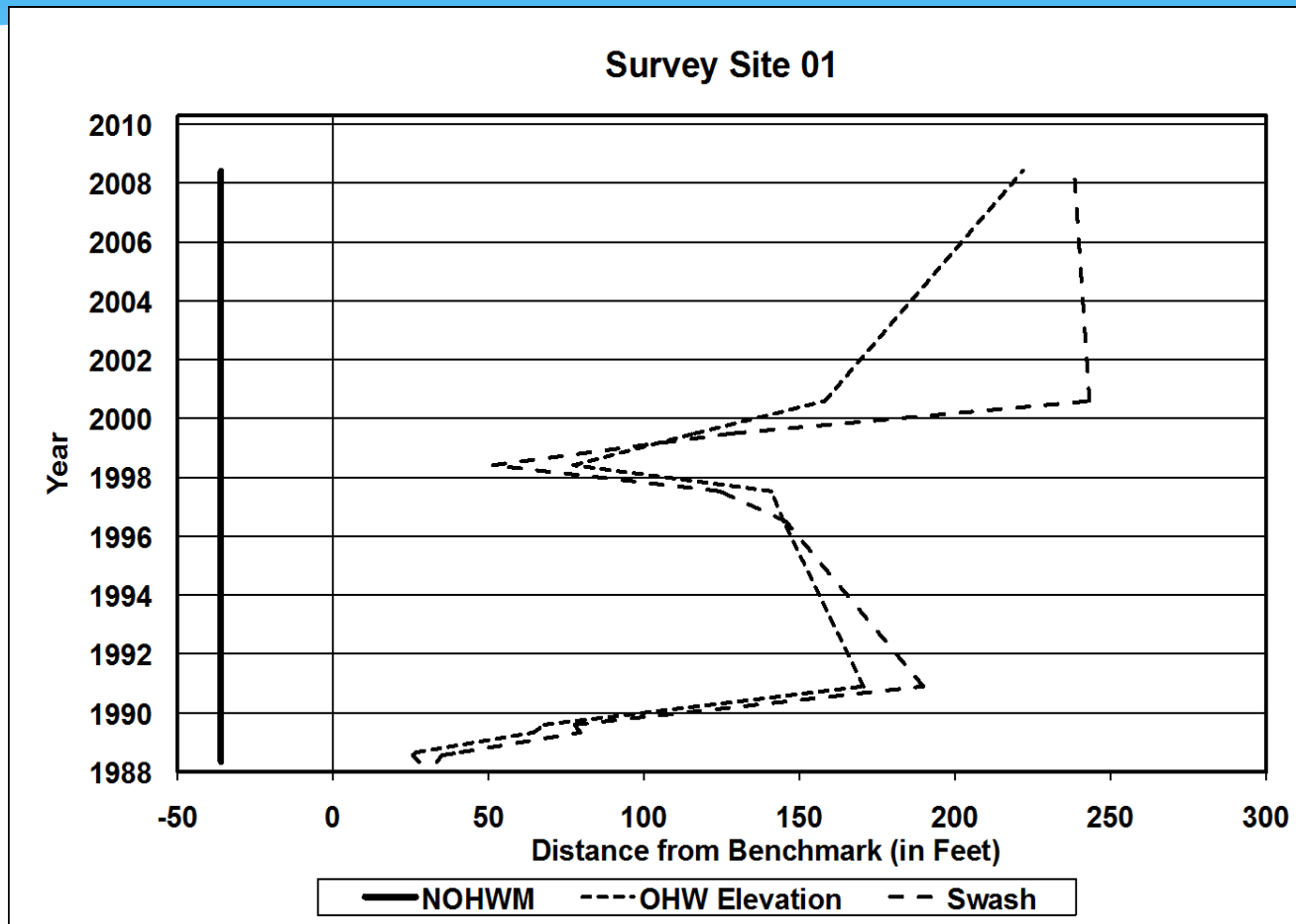


EOHWM

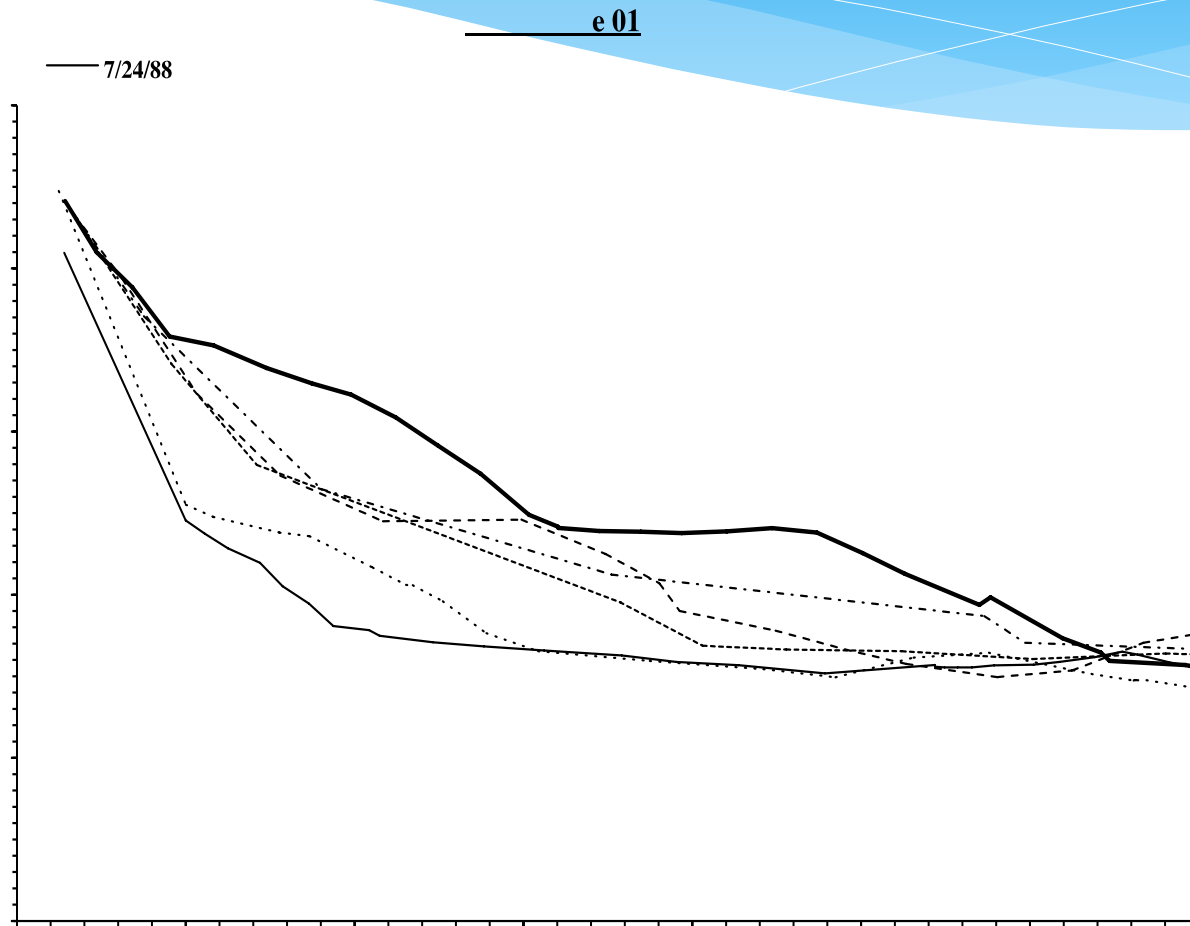
Intersection of Lake Michigan Shore with the OWH Elevation for Selected Sites Over Time



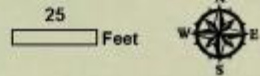
Same Site, 3 Points



Intersection Points with the OHW Elevation at Site UMo1 Over Time



Berrien County
Michigan/Indiana Stateline
New Buffalo Township
LWMD File # 70-11-0169-P

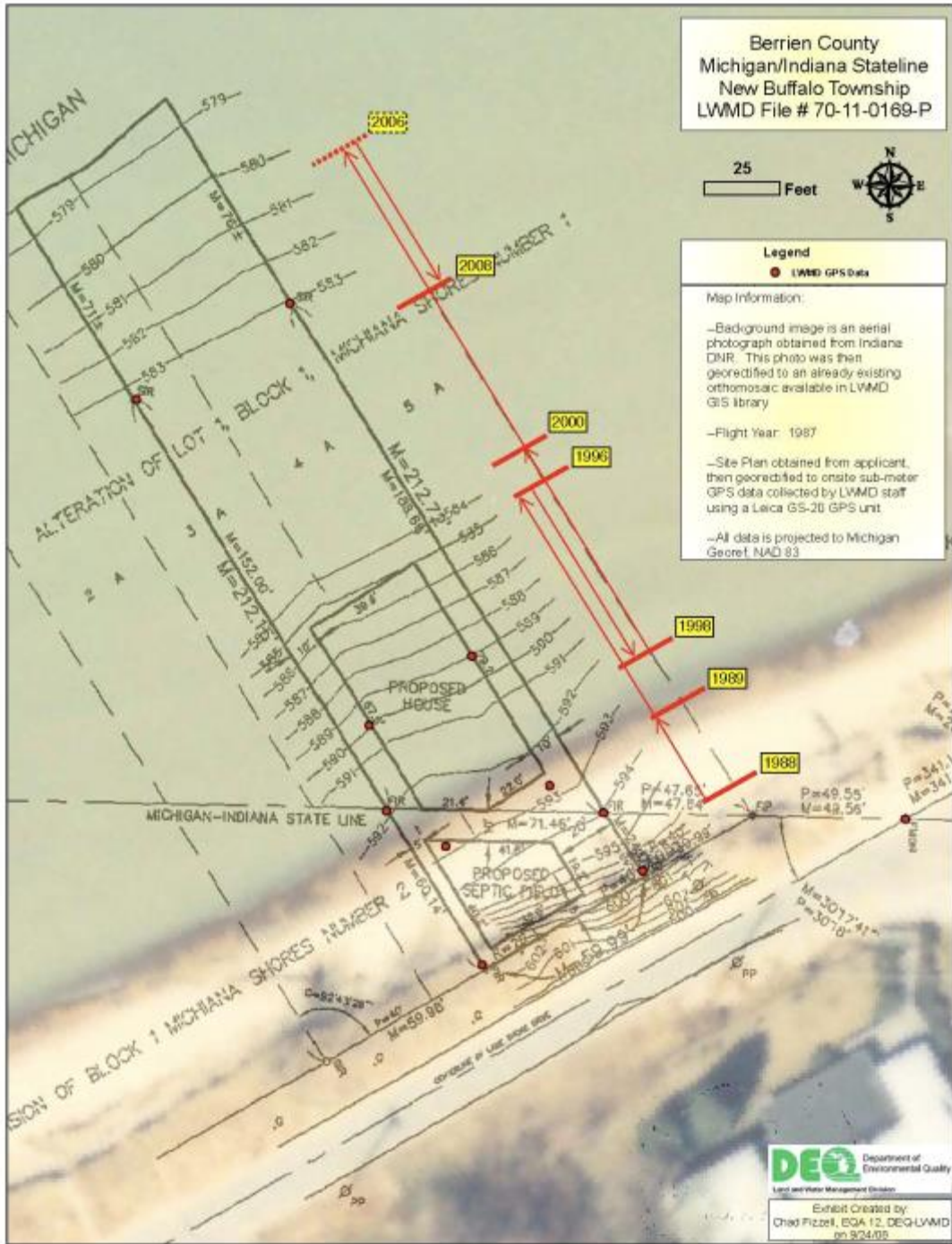


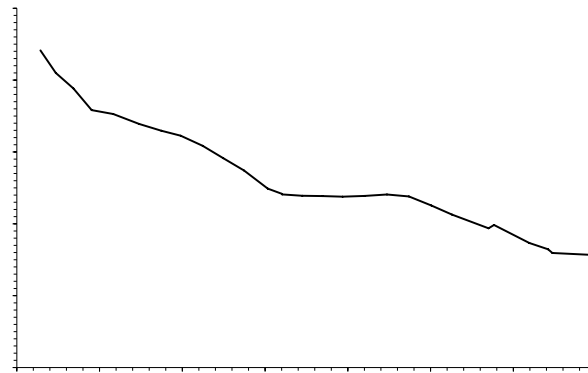
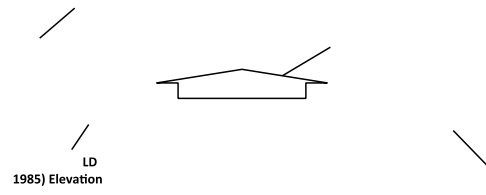
Legend

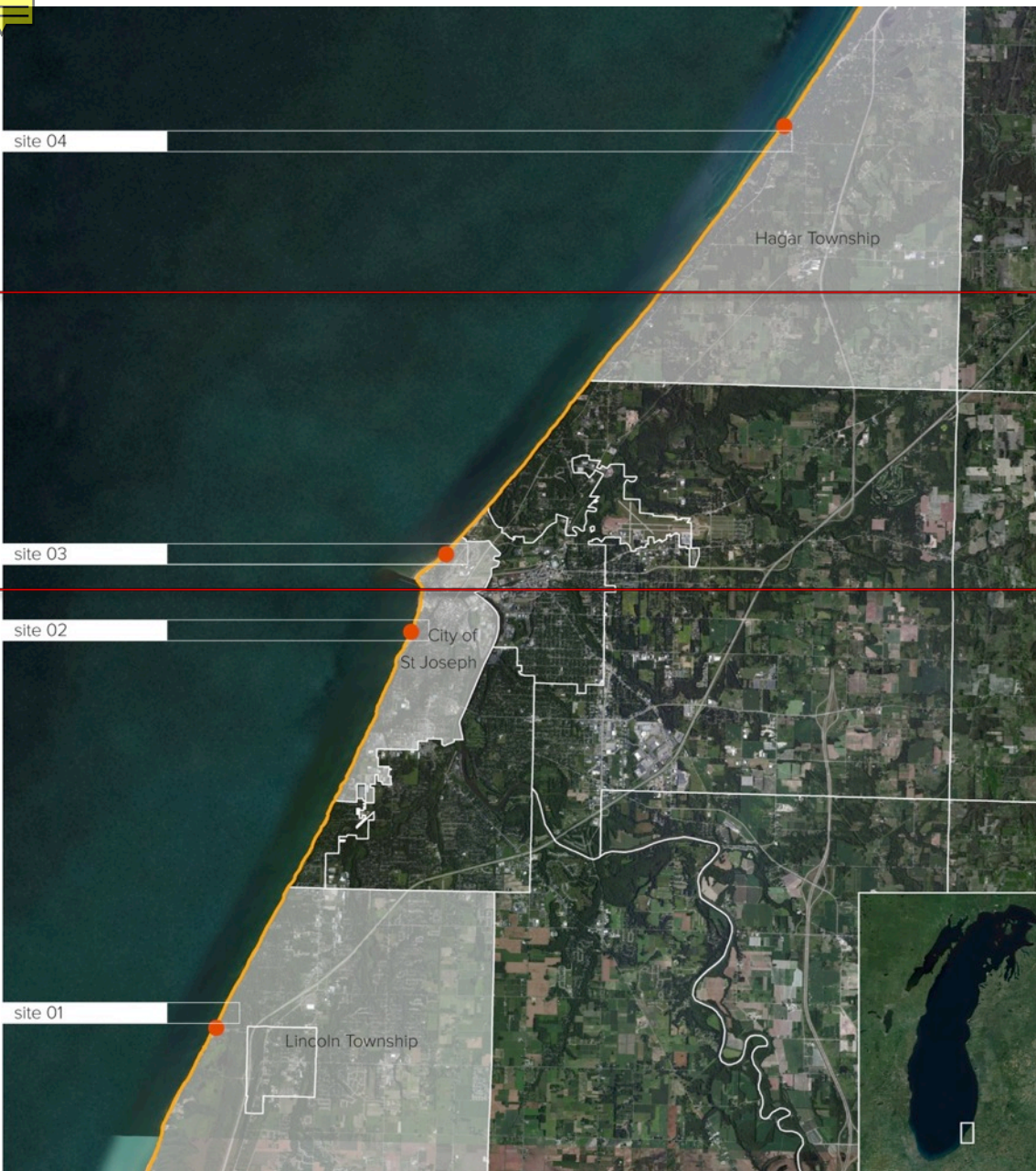
- LWMD GPS data

Map Information:

- Background image is an aerial photograph obtained from Indiana DNR. This photo was then georectified to an already existing orthomosaic available in LWMD GIS library
- Flight Year: 1987
- Site Plan obtained from applicant, then georectified to onsite sub-meter GPS data collected by LWMD staff using a Leica GS-20 GPS unit
- All data is projected to Michigan Geocent. NAD 83







site 04

Hagar Township

site 03

City of
St Joseph

site 02

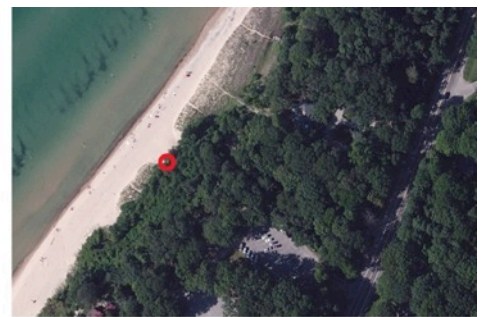
site 01

Lincoln Township

SITE 04

Hagar Township

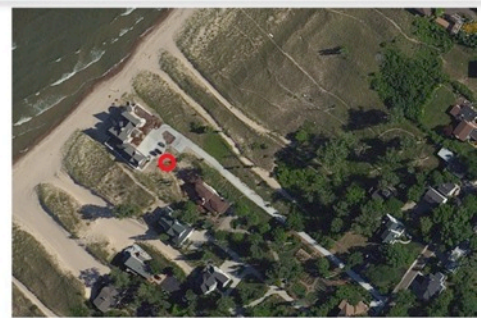
LATITUDE: 42° 12.687'
LONGITUDE: 86° 23.395'



SITE 03

City of St Joseph

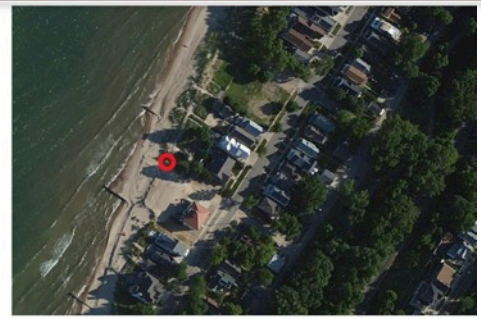
LATITUDE: 42° 7.242'
LONGITUDE: 86° 28.89'



SITE 02

City of St Joseph

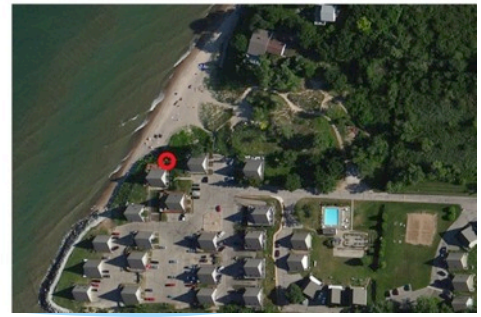
LATITUDE: 42° 6.264'
LONGITUDE: 86° 29.442'

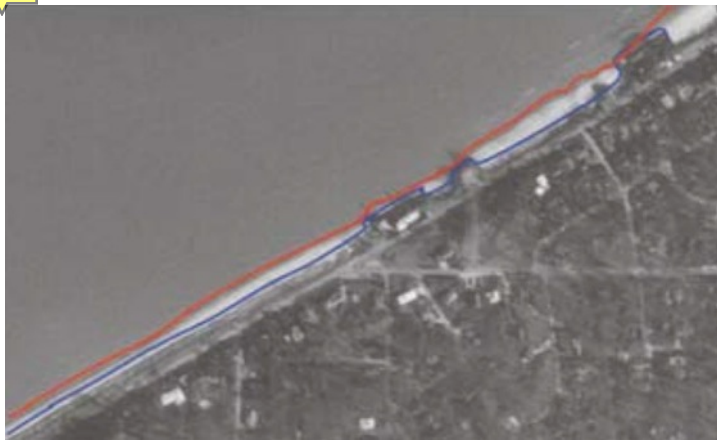


SITE 01

Lincoln Township

LATITUDE: 42° 01.266'
LONGITUDE: 86° 32.532'

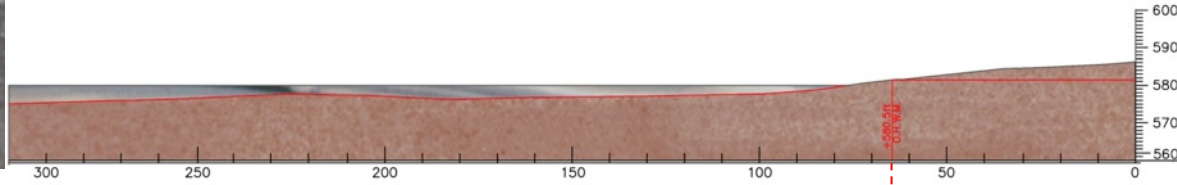




1998
UM01



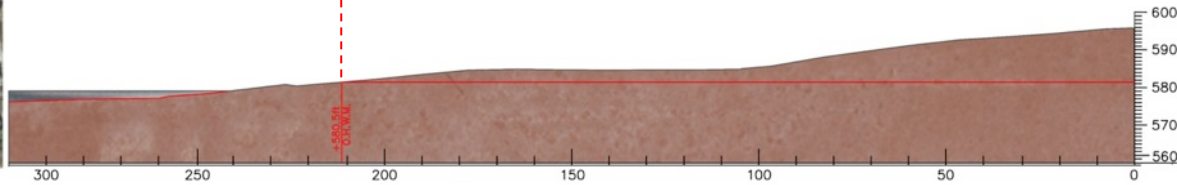
OHW Elevation 1998
Swash 1988



2008
UM01

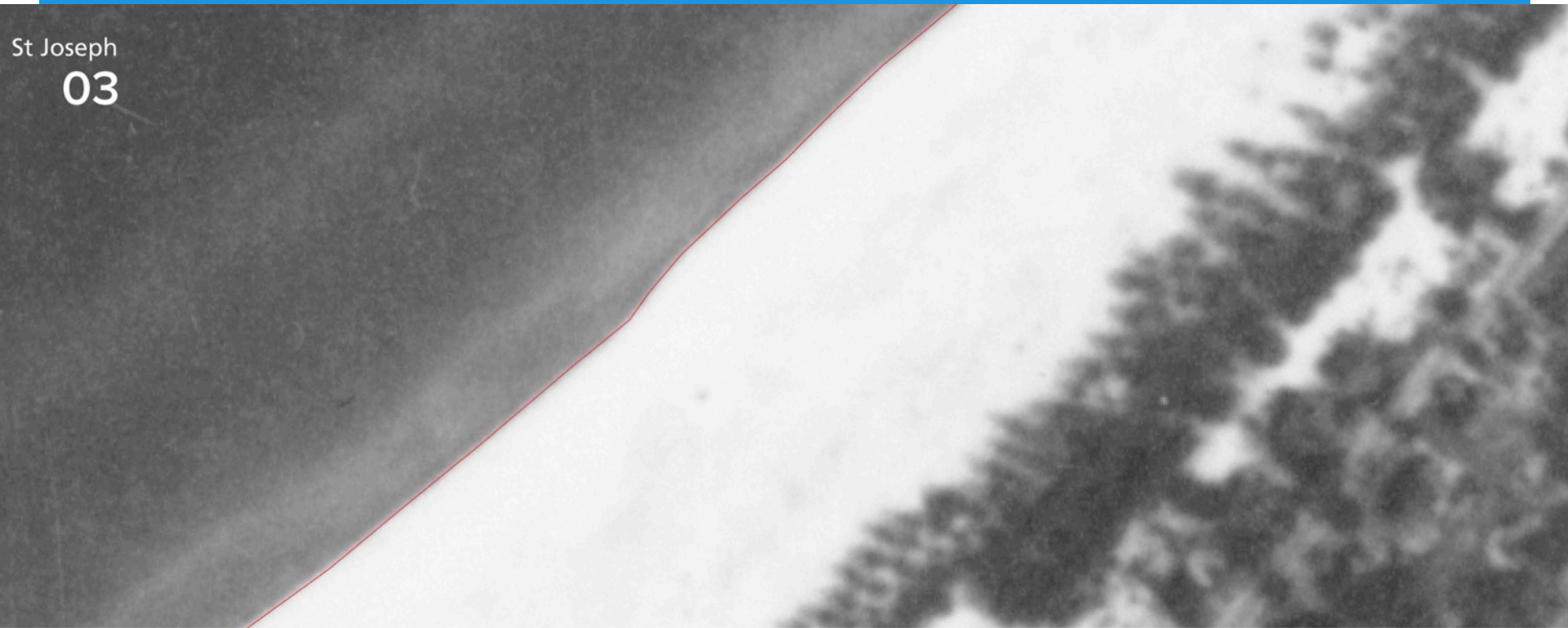
OHWE
(Ordinary High Water Elevation)
set in elevation +580.5 ft
Horizontal registration difference
(Threshold)
140 ft

OHW Elevation 1998
Swash 1988

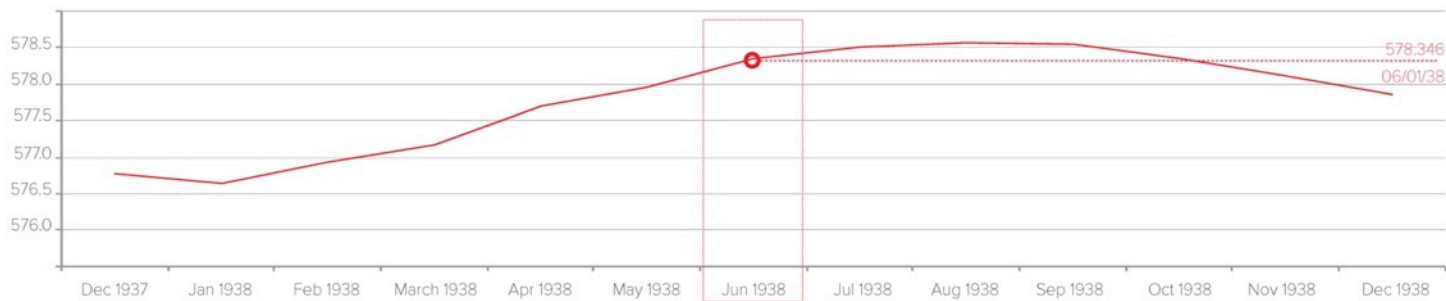


Legislating the OHWE: dynamics of a fixed line

St Joseph
03



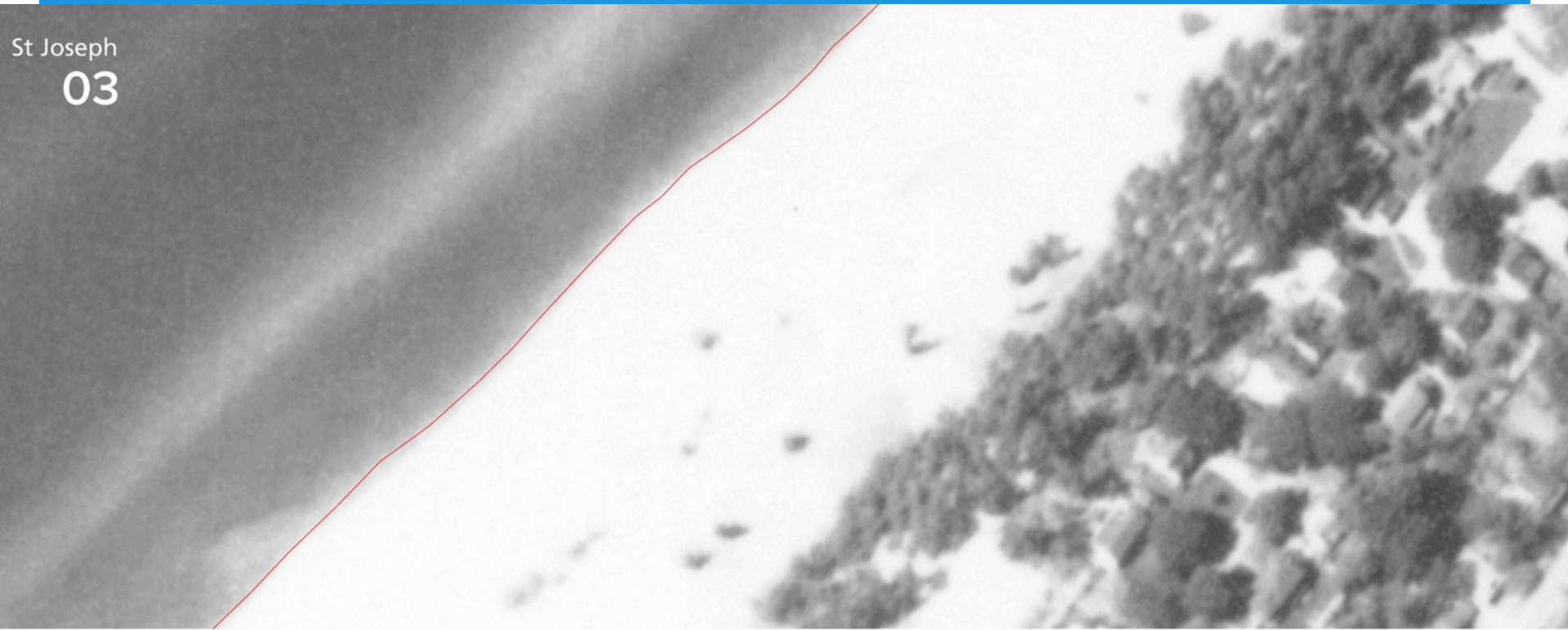
1938



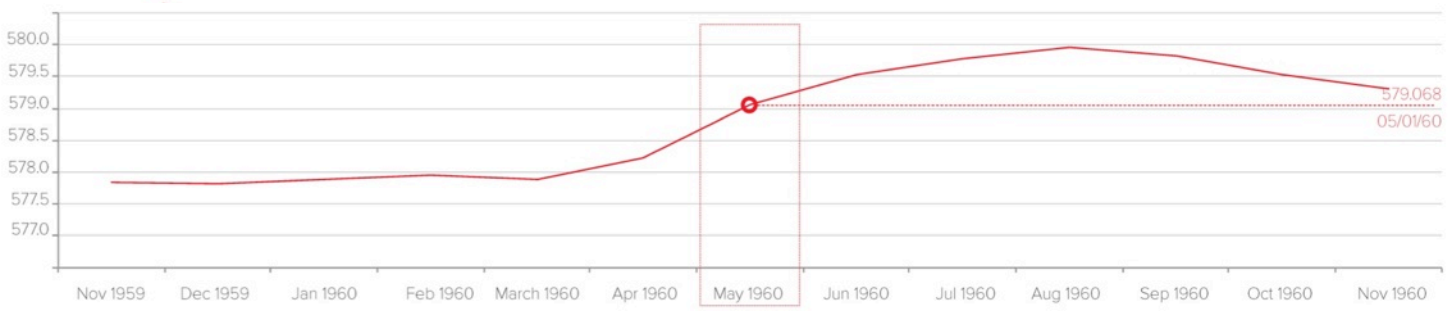
JUNE 1938 AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03



1960



MAY 1960 AERIAL PHOTO

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03



1985



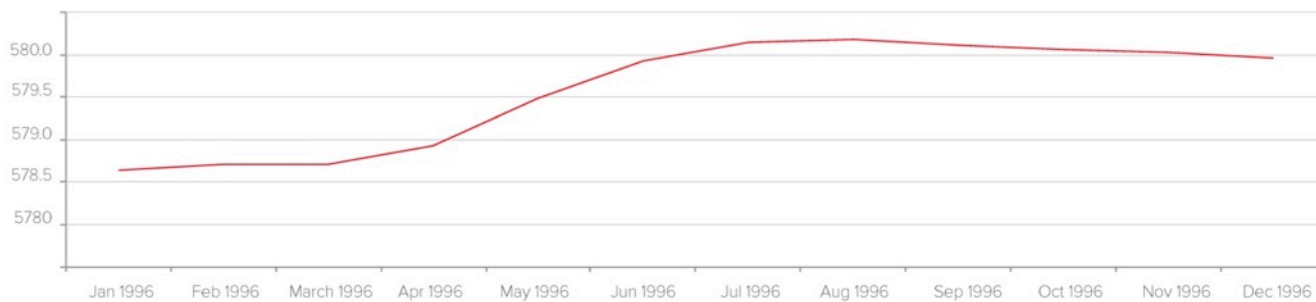
**APRIL 1985
AERIAL PHOTO**

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03

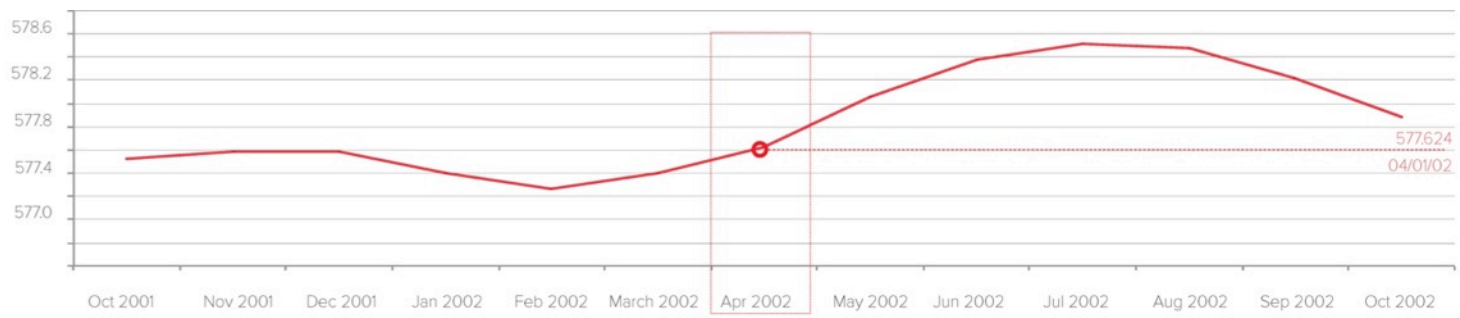


1996



1996 (12530195)
AERIAL PHOTO

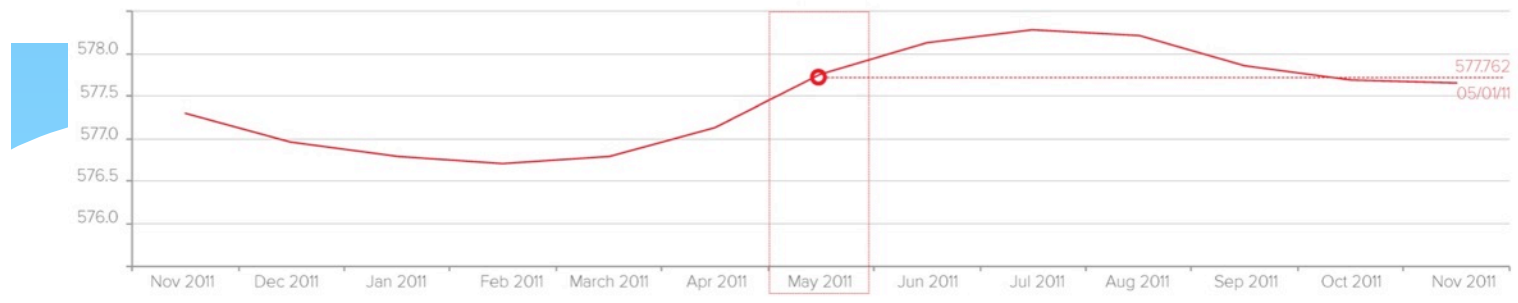
GRAPH: LAKE LEVELS
during the year



**APRIL 2002
AERIAL PHOTO**

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03



**MAY 2011
AERIAL PHOTO**

GRAPH: LAKE LEVELS
in the 6 months before and
after the survey

St Joseph
03



June 1938

future scenario:
projected conditions 1938



St Joseph
03



May 1960

future scenario:
projected conditions 1960



St Joseph
03



April 1985

future scenario:
projected conditions 1985

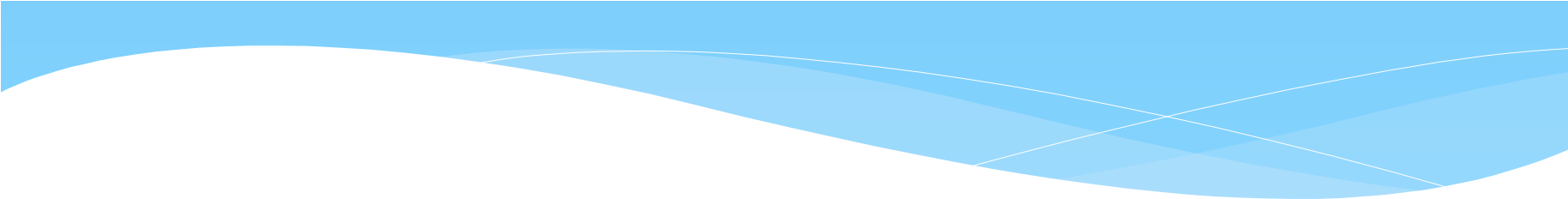


St Joseph
03



1996

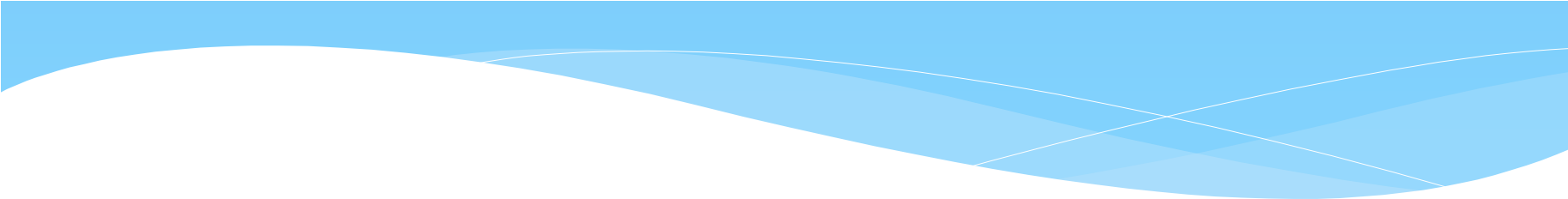
future scenario:
projected conditions 1996



St Joseph
03



**future scenario:
projected conditions 2002**



St Joseph
03



April 2002

1996

April 1985
May 1960
June 1938

**future scenario:
under past conditions**



What To Do?

1. Revisit / repeal the EOHWM provisions of the GLSLA (or don't adopt if not currently used)
 2. Revisit the law of accretion, erosion, and avulsion
 - * Strong Property Rights: Retain the common law avulsion doctrine
 - * Pros: Favors private shoreland owners (allowing for sea walls)
 - * Cons: Lost homes (ultimately), lost public trust beaches
 - * Strong Public Trust: Jettison the accretion/avulsion doctrine
 - * Pros: Preserves public trust beaches
 - * Cons: Accelerates loss of homes / requires retreat
- * What to do?