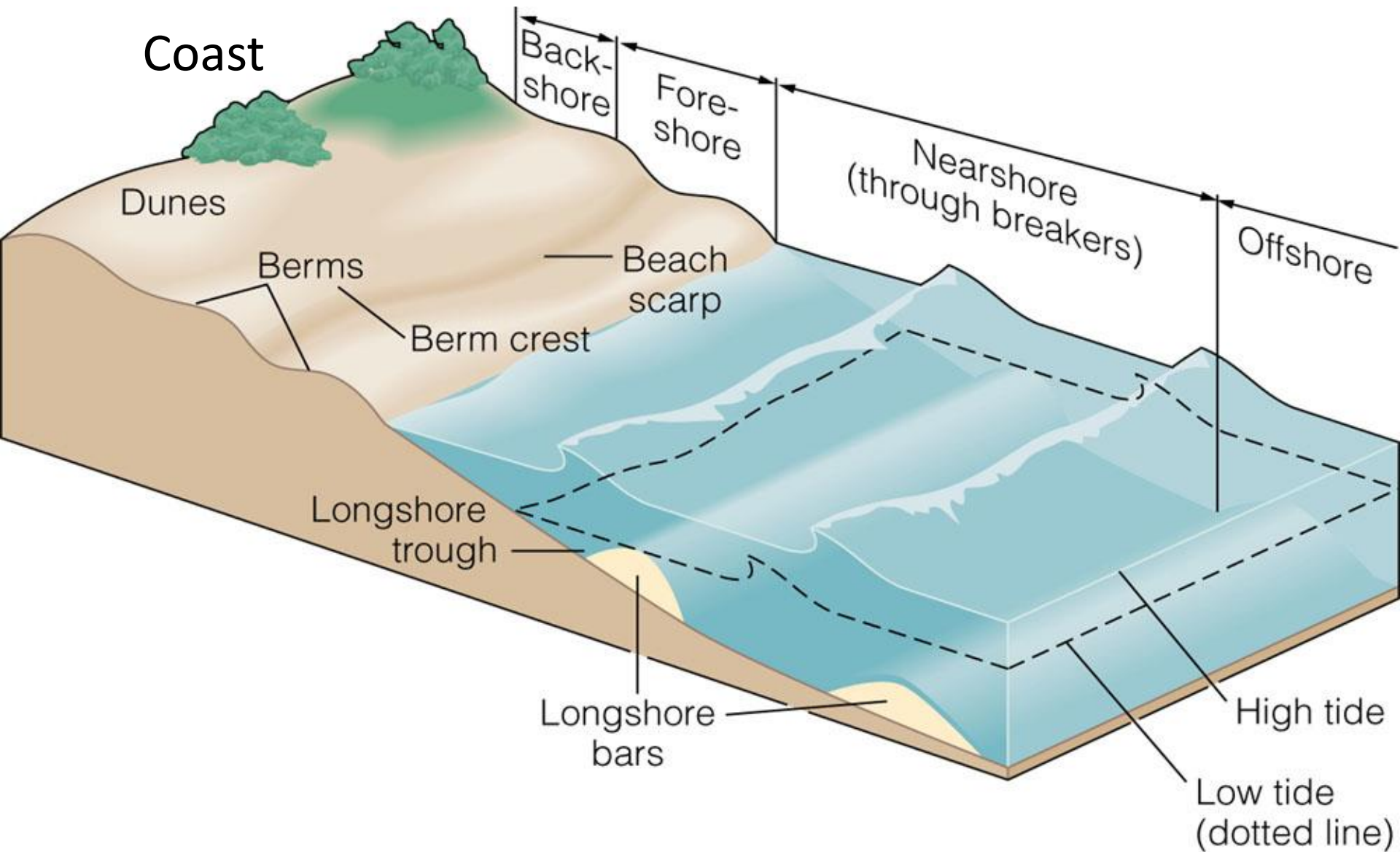


Beach Erosion and Regional Sediment Management



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WI Coastal Beaches Working Group Annual Meeting
Oshkosh, WI Nov 14, 2016

Typical Beach Profile



Wisconsin Diverse Coasts with Natural Beaches

High Bluffs



Low Bluffs



Sandy Berms



Dunes

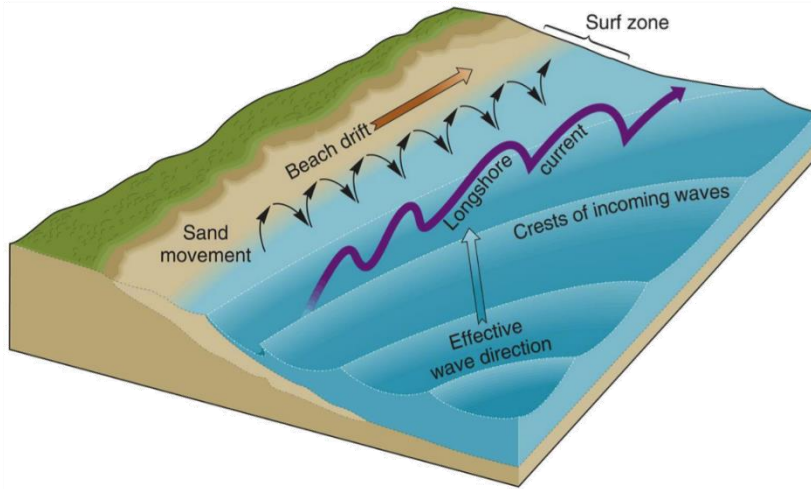


Beach Erosion Examples



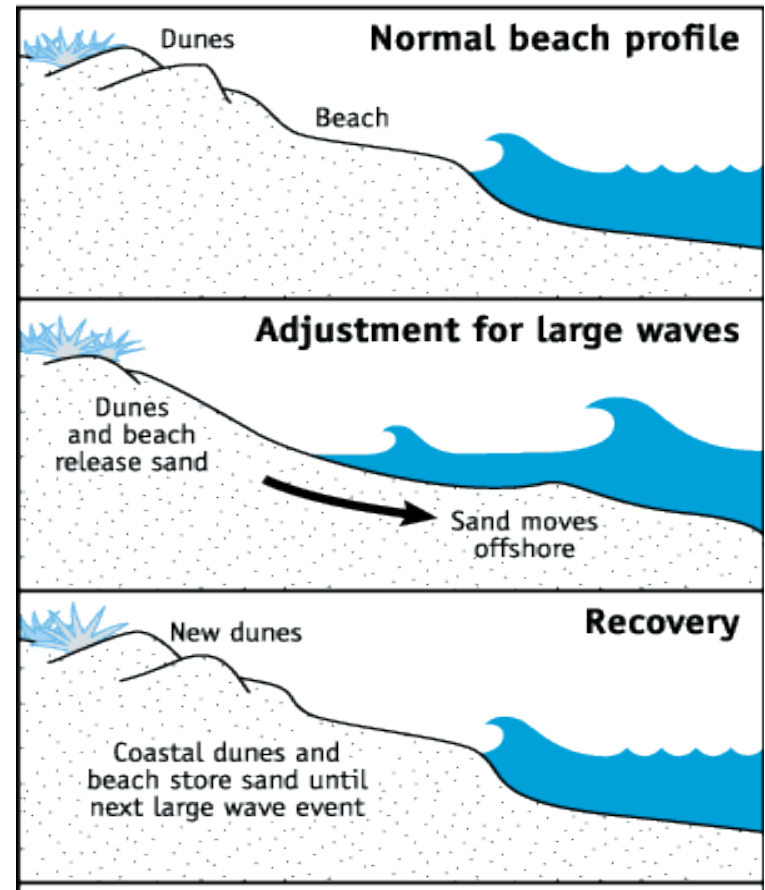
Natural Beach Sediment Transport

Longshore (Wave at an angle)



Longshore transport
moves with waves

Cross-shore (Wave parallel)



Offshore transport occurs naturally during storms
Onshore transport occurs naturally during mild waves

Beaches vs. Water Level Changes

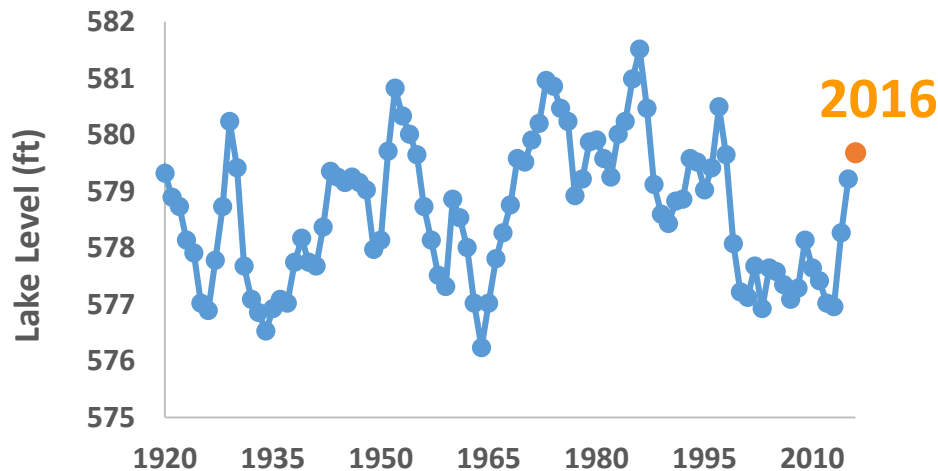
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Lake Michigan water levels rapidly rise after record lows

Green Bay **Press-Gazette**
PART OF THE USA TODAY NETWORK

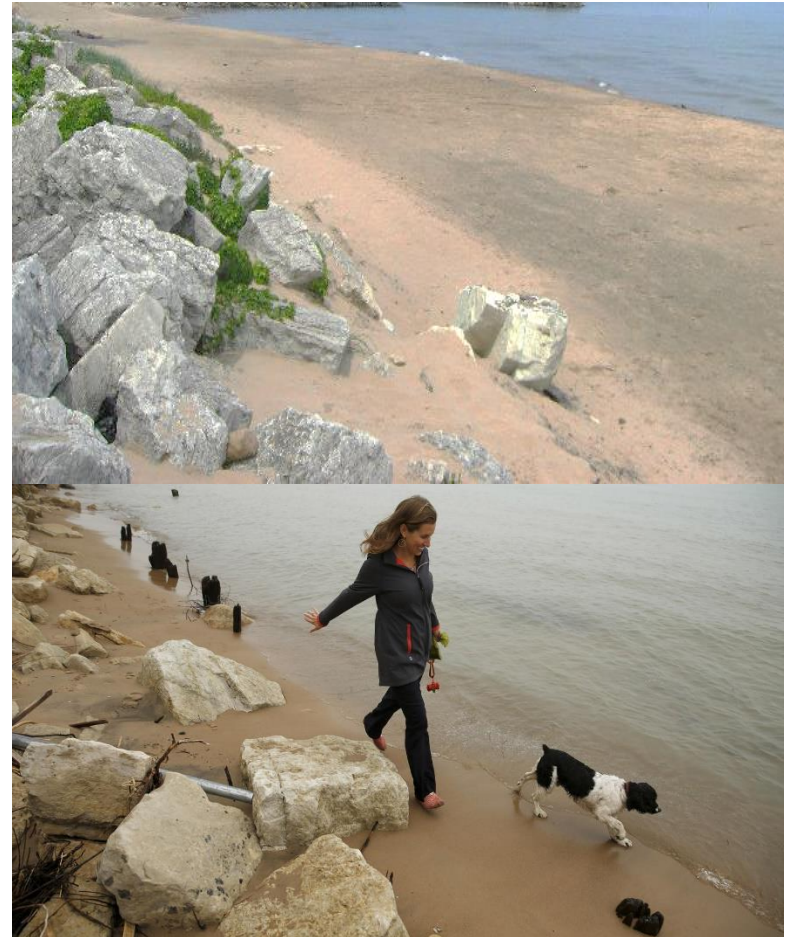
Lake Michigan water levels see 'historic' rise

Lake Michigan Annual Average Water Level



Chicago Tribune

Beaches shrinking as Lake Michigan rises to near-record level



Beaches vs. Wave Seasonal Changes



*Beach sediment is transported **naturally by waves.***

Coastal Structure Beach Alteration

Revetments



Ozaukee County

- Protected uplands
- Beach loss in front of revetment
- Adjacent beach and bluff erosion

Coastal Structure Beach Alteration

Groins & Jetties



Racine County

- Maintained beaches
- Longshore sediment drift trapped (Down drift beaches eroded)



Milwaukee County

Coastal Structure Beach Alteration

Offshore Breakwaters



Lake Forest, IL



Milwaukee County

- Stabilized beaches and bluffs
- **Dangerous currents!**
- **Possible water quality concern**
- **Adjacent beaches eroded**

Summary

- Wisconsin's **beaches** are **ecologic**, **economic**, and **cultural** assets
- **Fluctuating lake levels** either rapidly **drown** or **expose** beaches
- Unbalance of **longshore and cross-shore sediment transport** will affect **beach** stabilization
- **Coastal structures** (revetments, groins, offshore breakwaters) mitigate **beach** erosion but lead to coastal erosion elsewhere and other issues
- “**Integrated Beach Management**” strategies needs to be developed and implemented. **Beach Health, Safety & Stability!!**

Comments or Questions ??????