

How Well Have Florida Inlet Management Plans Worked to Continue Sand Flow?



Port Everglades Entrance

Florida Has Plenty of Inlets/Passes (66)

- A dozen are not natural, but were cut, and 41 of the 66 were modified for navigation by being jettied and/or dredged



Discussion

1. Modified inlet impacts on shorelines before being masked by beach nourishment
2. Inlet Management Plans to address the impacts
3. How well have the Plans worked



St Johns River Entrance

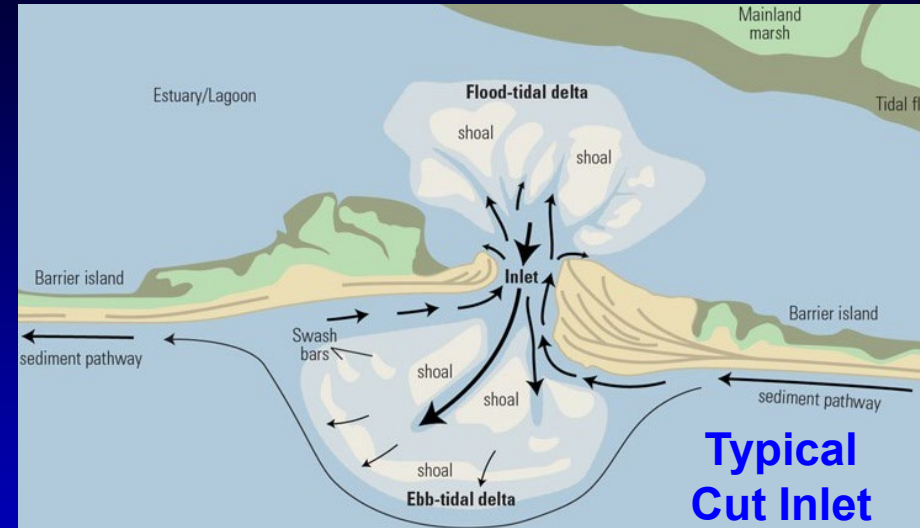
1. Modified Inlet Impacts on Shorelines

- A common argument against fighting coastal erosion:
 “You can’t fight Mother Nature”
- The fight has largely not been with Mother Nature, but with inlets modified for navigation

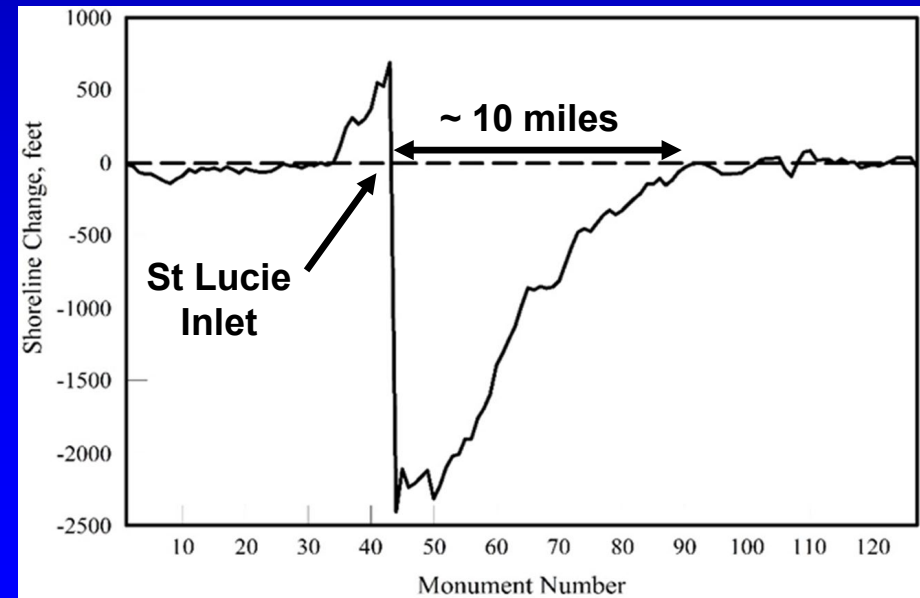


Modified Inlets Produced Massive Shoals

- Removed ~ 225 million yd^3 of sand from the littoral system (Houston and Dean 2016)

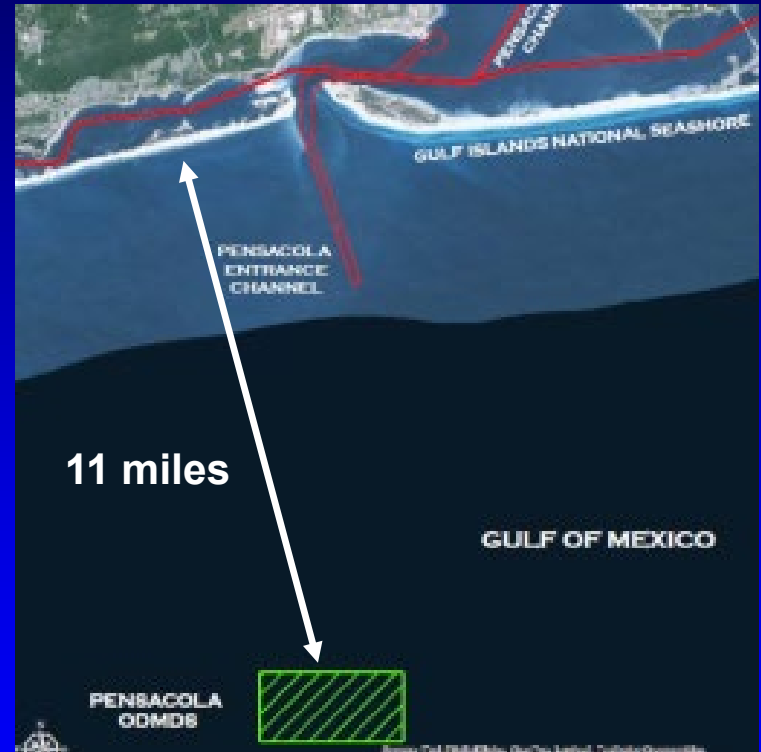


- For example, shoals grew by ~ 21 million yd^3 at St Lucie Inlet after it was cut (Marino and Mehta 1988)



Ocean Disposal

- Ocean disposal of dredged sand took about 60 million yd^3 of sand out of the littoral system (Houston and Dean, 2014)

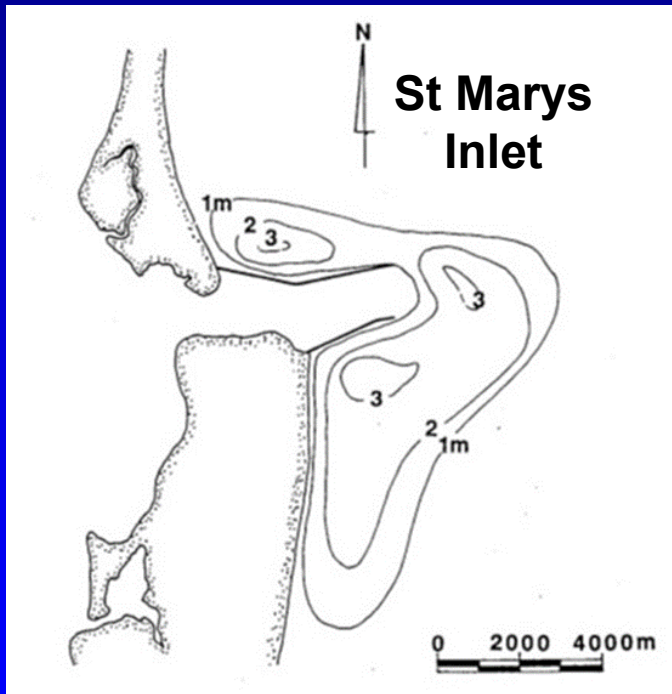


Beach Nourishment Versus Inlets

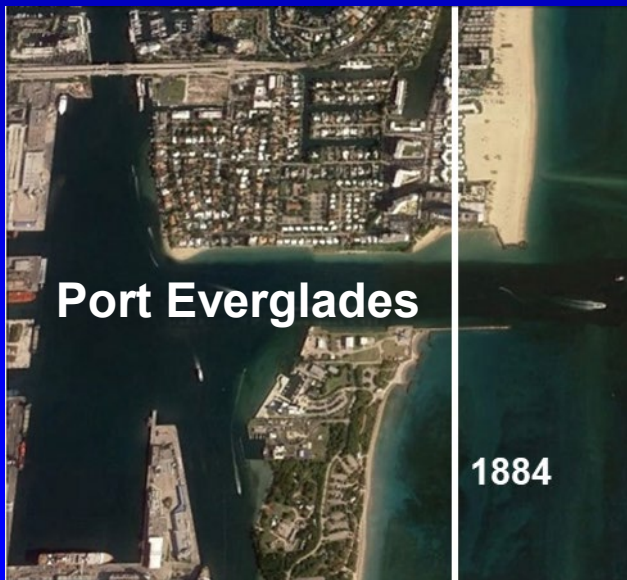
- Nourishment = only about 70% of the sand lost to the littoral system due to modified inlets (Houston 2020)

Modified Inlets
- 285 million yd^3

50 Years of Nourishment
+ 200 million yd^3



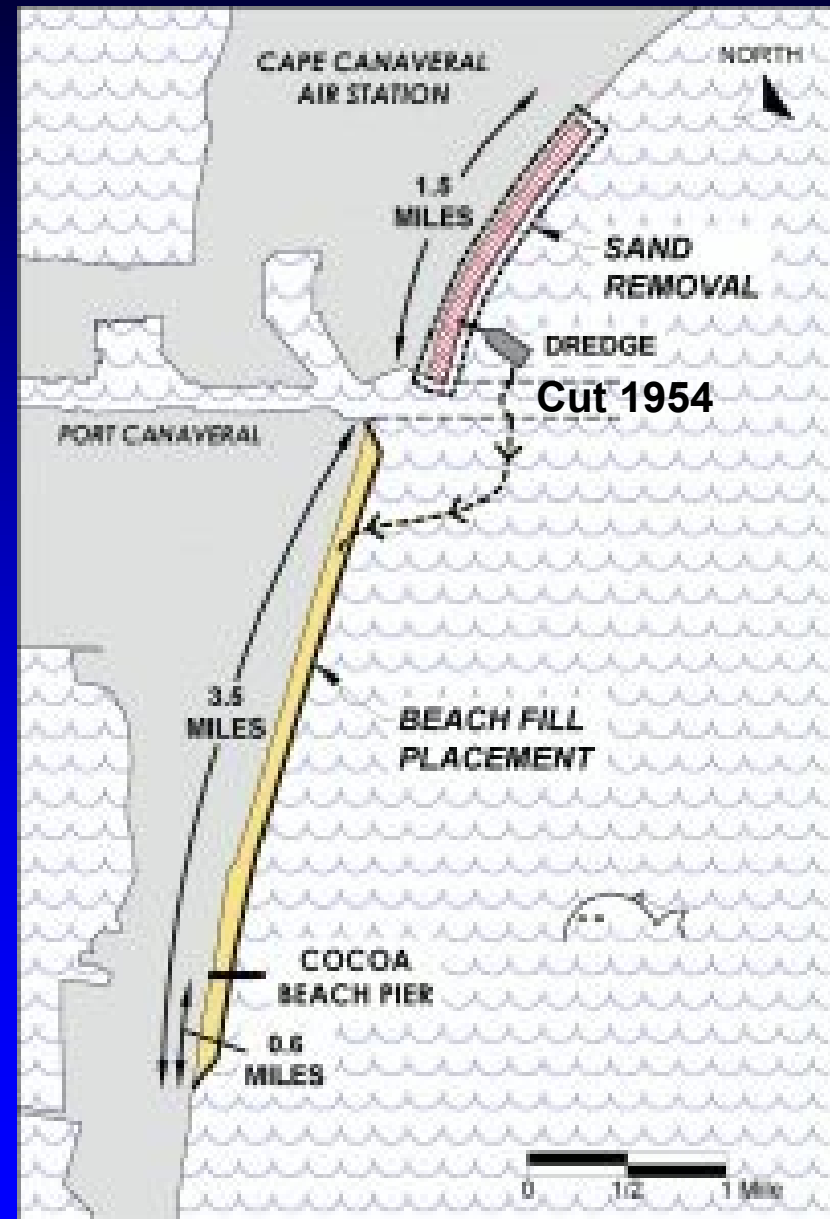
Downdrift Recession – Modified Inlets



Bypassing is THE Answer

“With the interruption of the longshore sediment transport by inlets modified for navigation, if the downdrift beaches are to be stabilized, there must be an effective sand transfer”

Bob Dean and
Morrough P. O'Brien, 1987



State Government Stepped Up

Florida Statute 161.142 in 1986

“It is in the public interest to replicate the natural drift of sand which is interrupted or altered by inlets and for each level of government to undertake all reasonable efforts to maximize inlet sand bypassing”

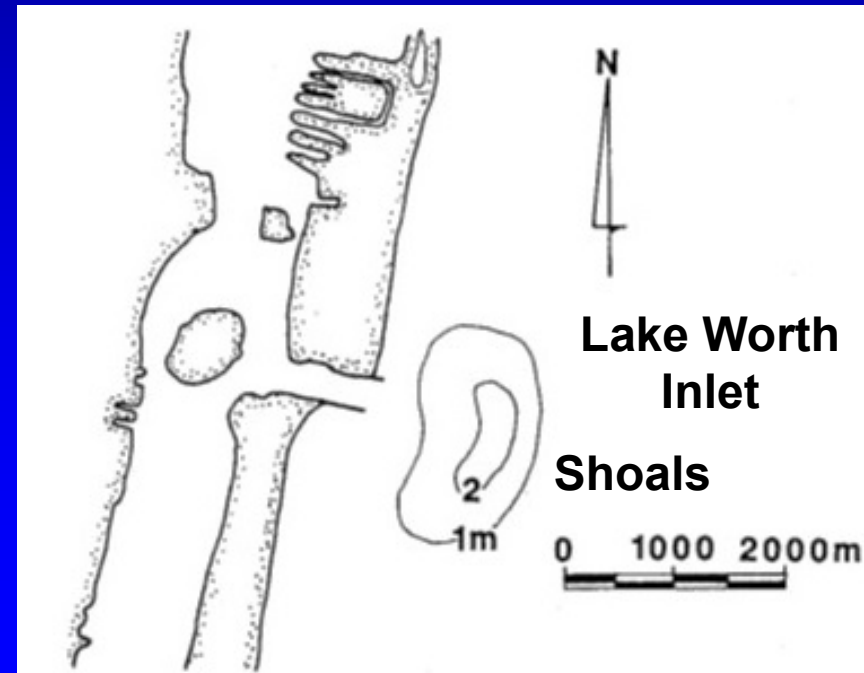


2. Inlet Management Plans (IMPs)

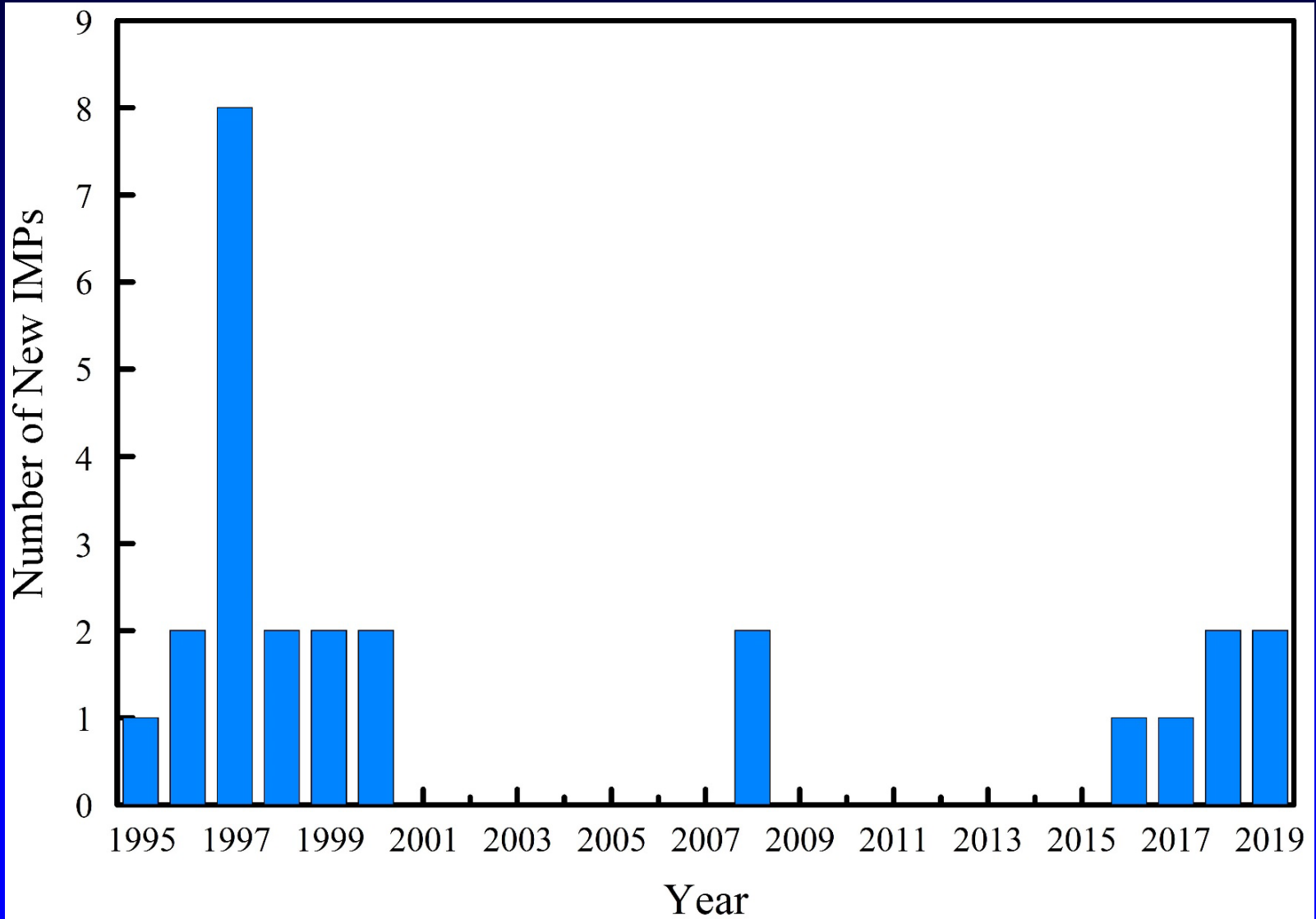
- The State directed the FDEP (Florida Department of Environmental Protection) to report annually on:

“ ... the extent to which each inlet project has succeeded in balancing the sediment budget of the inlet and adjacent beaches and in mitigating the inlet’s erosive effects on adjacent beaches”

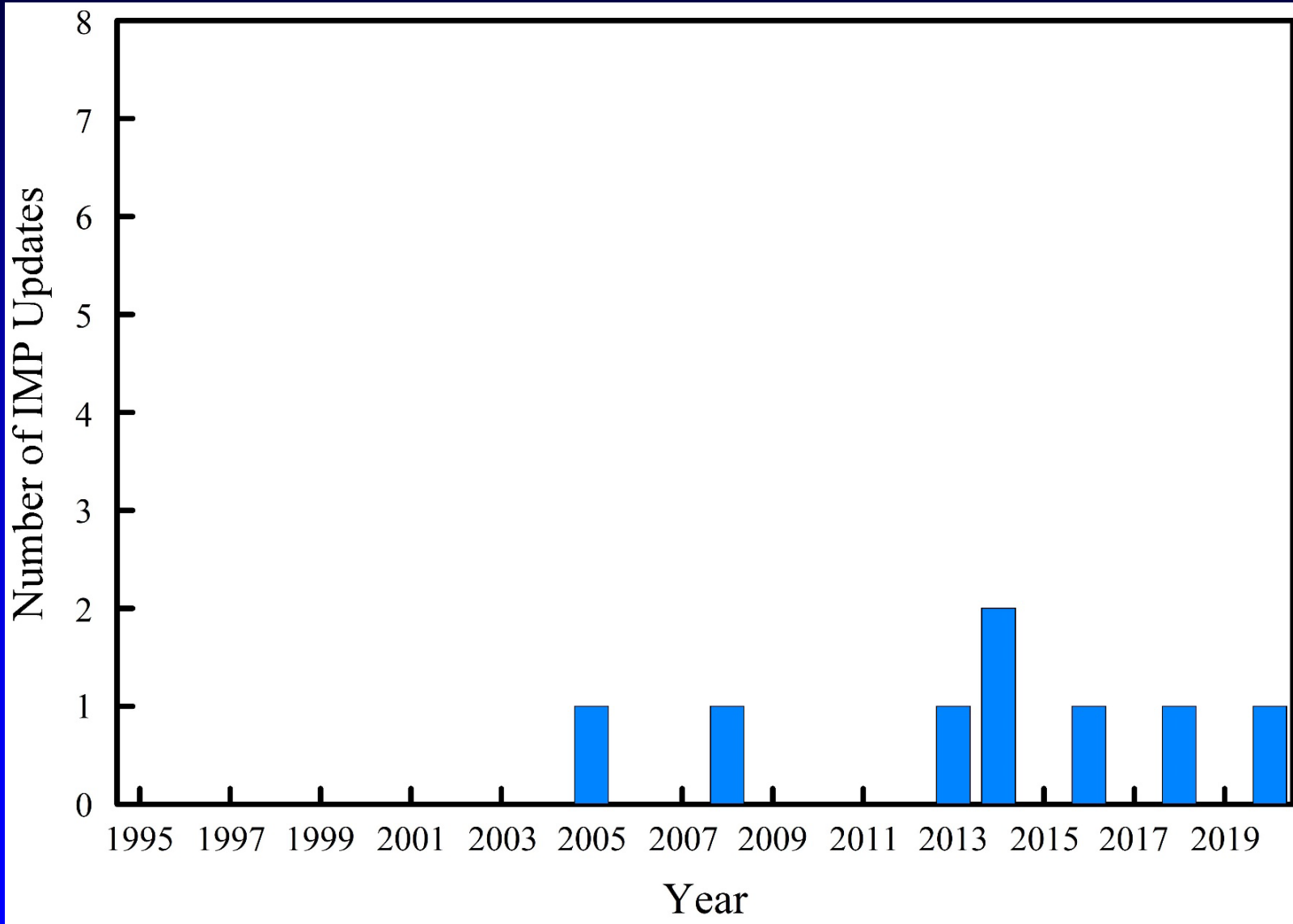
- FDEP and local inlet authorities worked to develop IMPs to bypass average required volumes



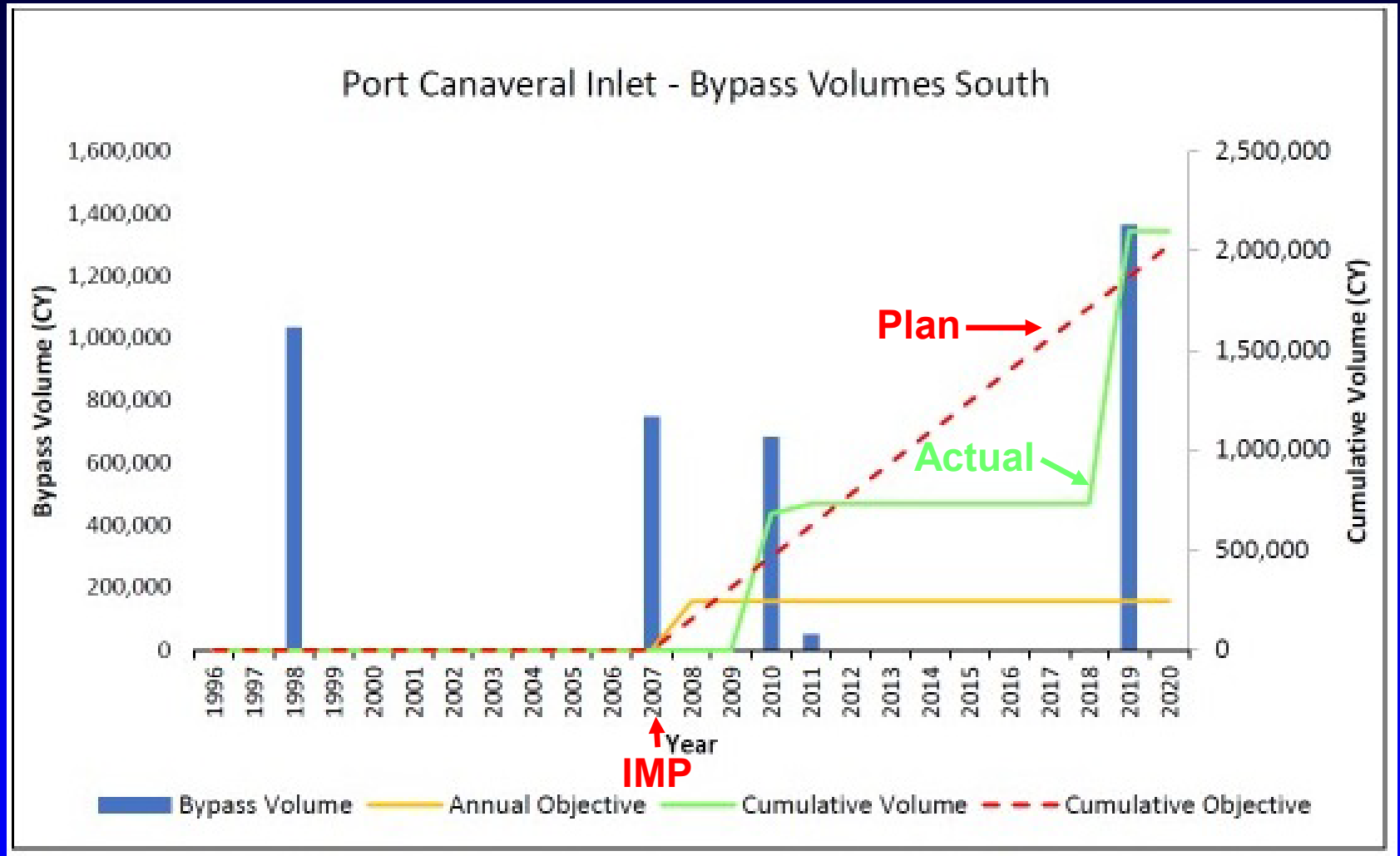
Starting Years for IMPs



IMP Updates



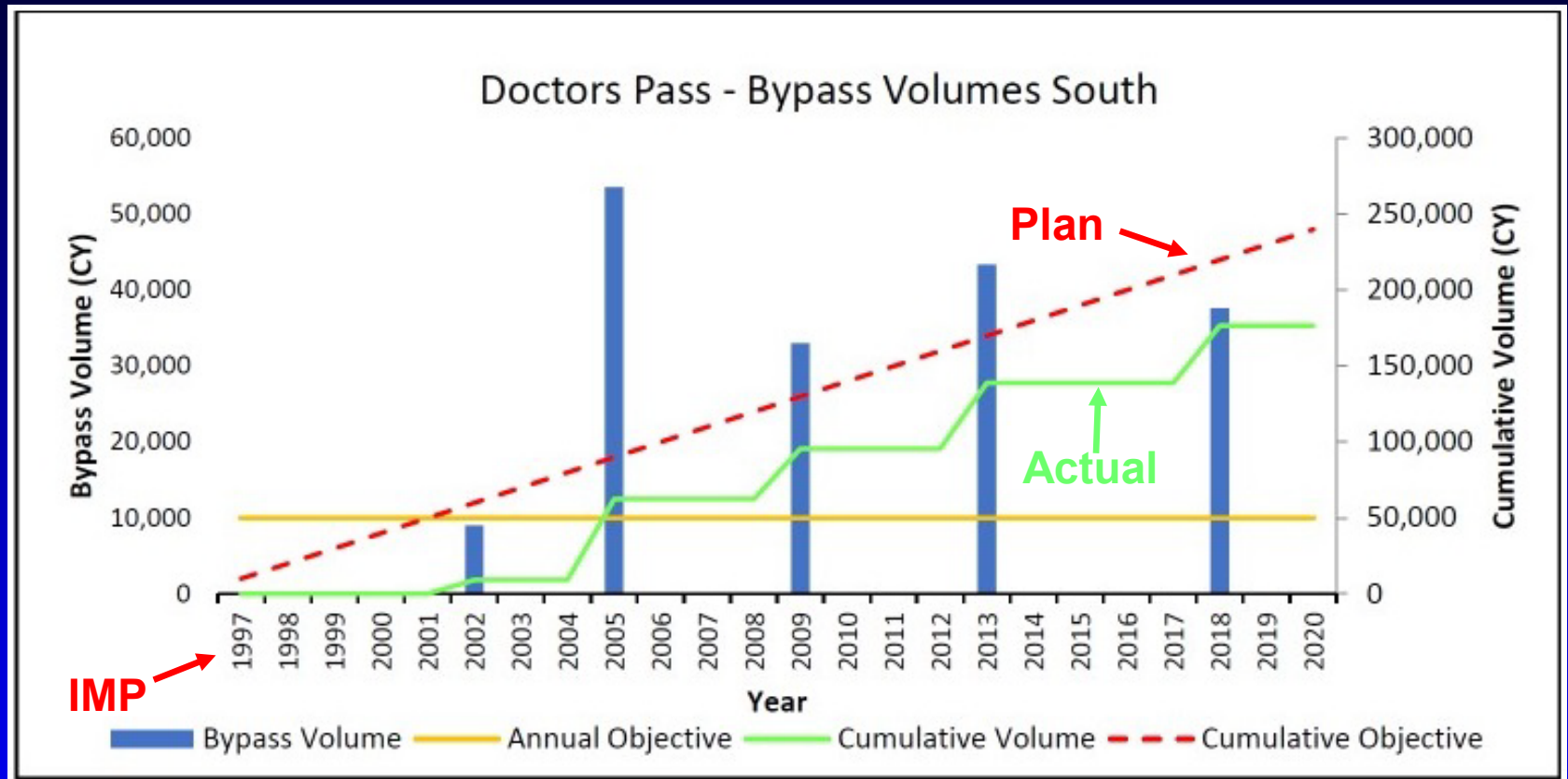
Plan Versus Actual - Dredge



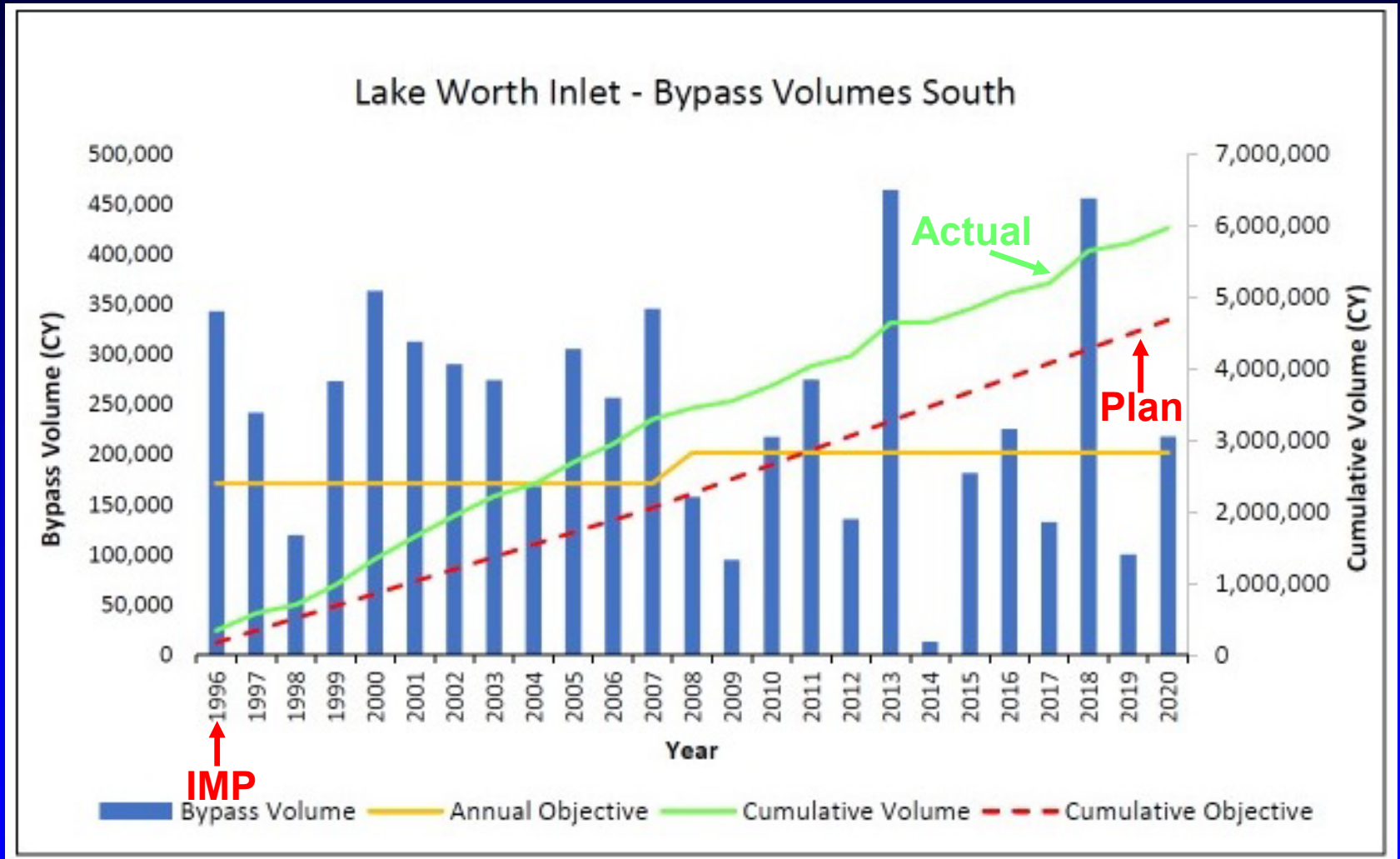
Port Canaveral Bypassing



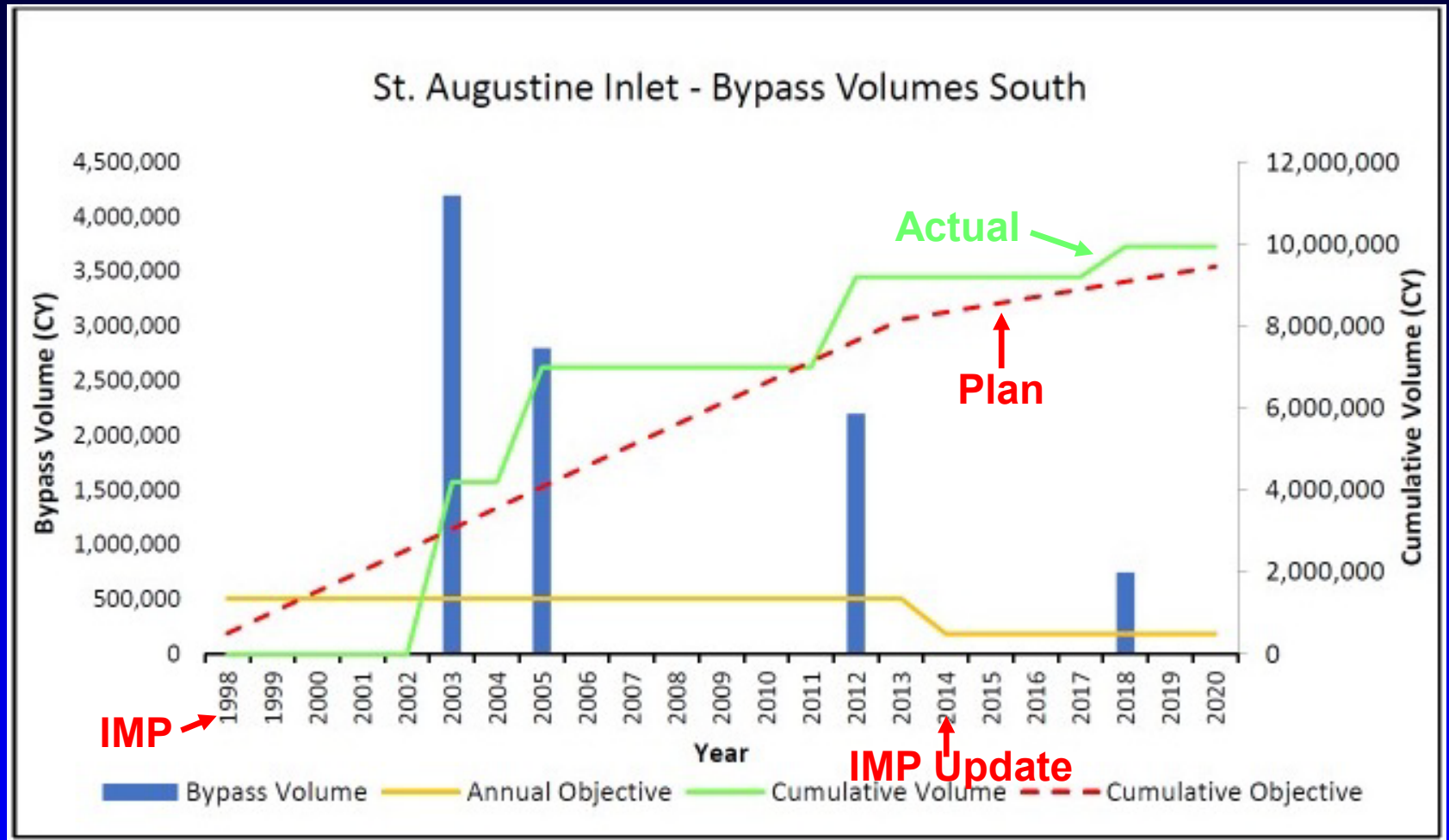
Plan Versus Actual – Dredge



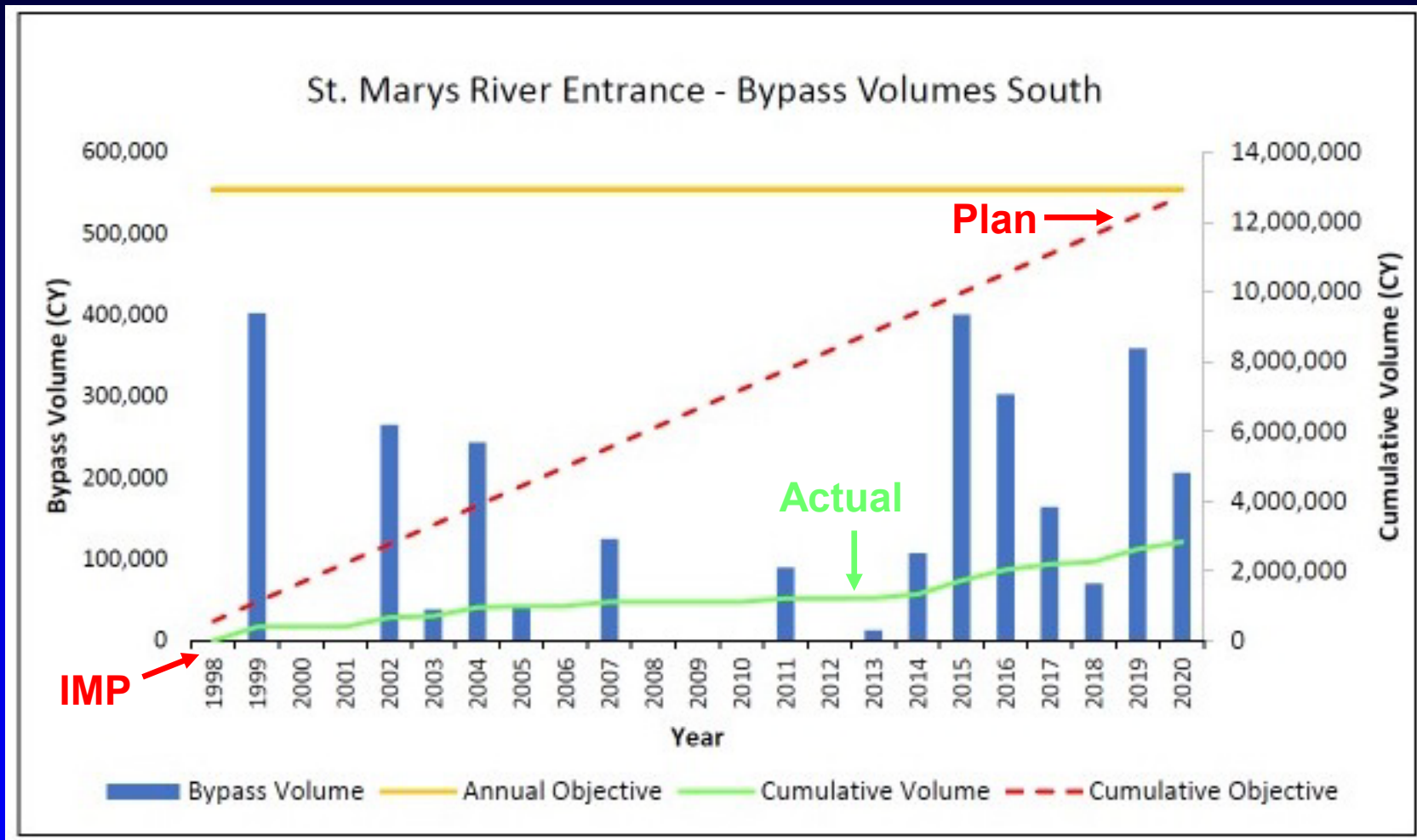
Plan Versus Actual – Fixed Plant



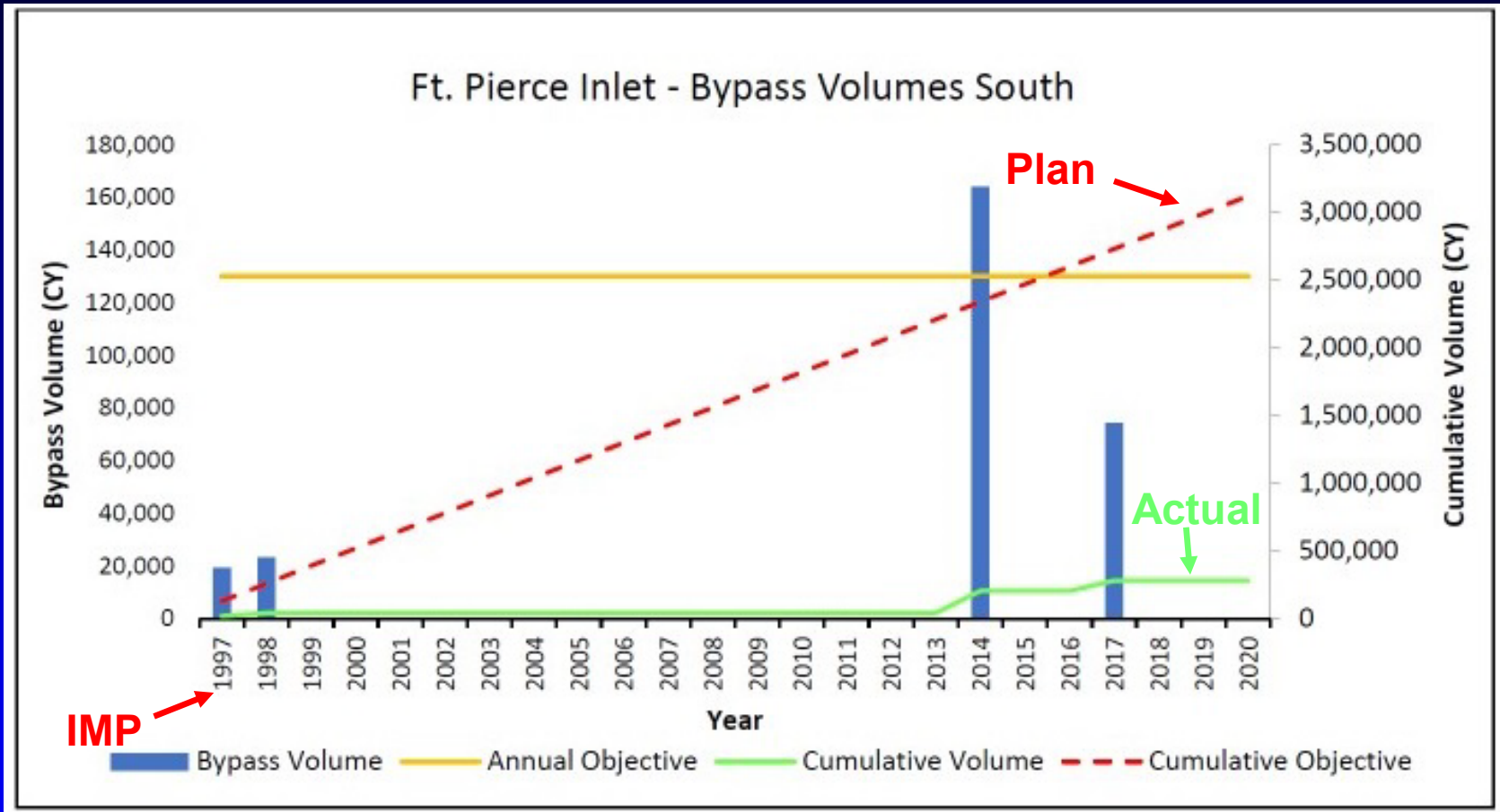
Plans Can Be Modified



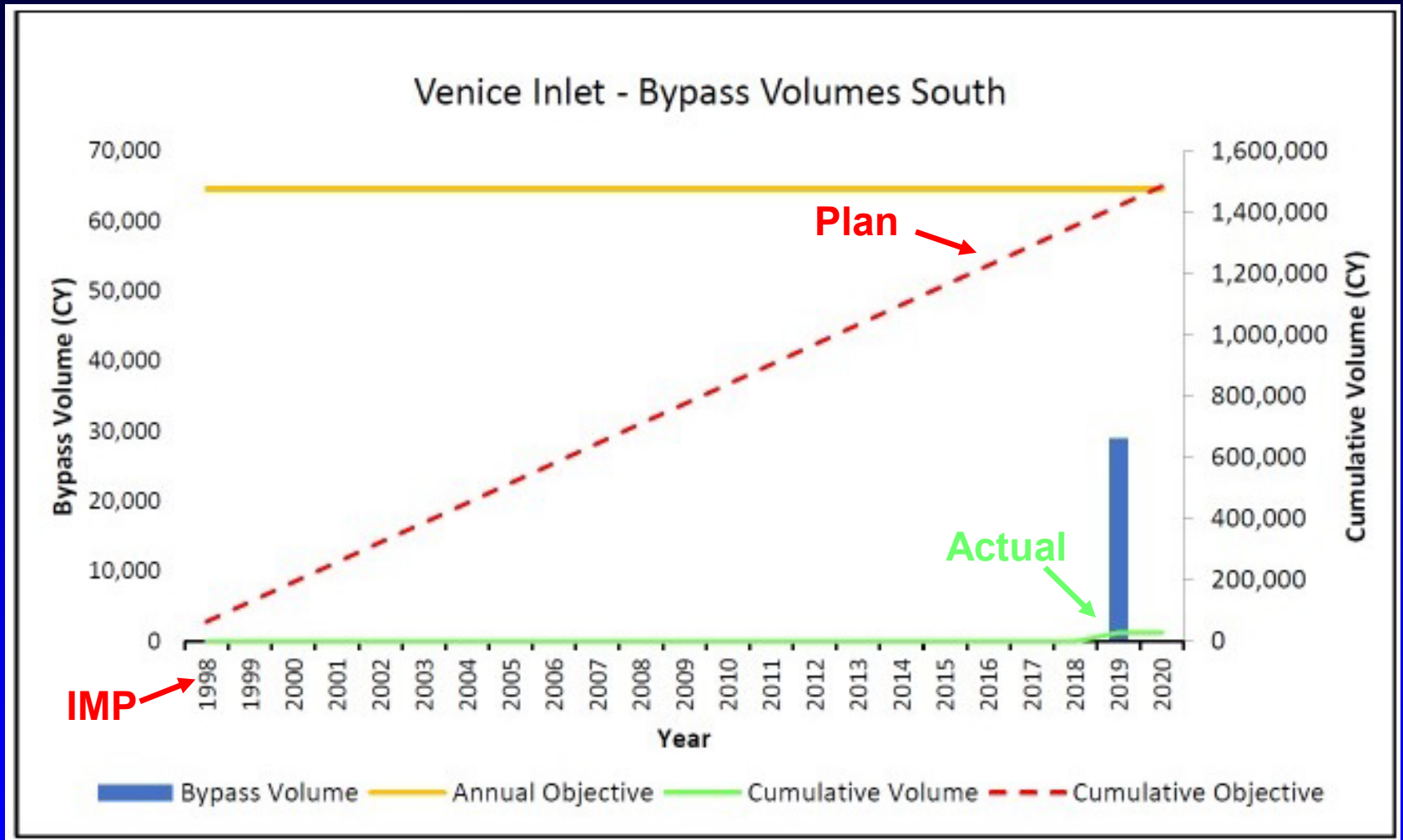
Not All Plans Meet Goals



Not All Plans Meet Goals

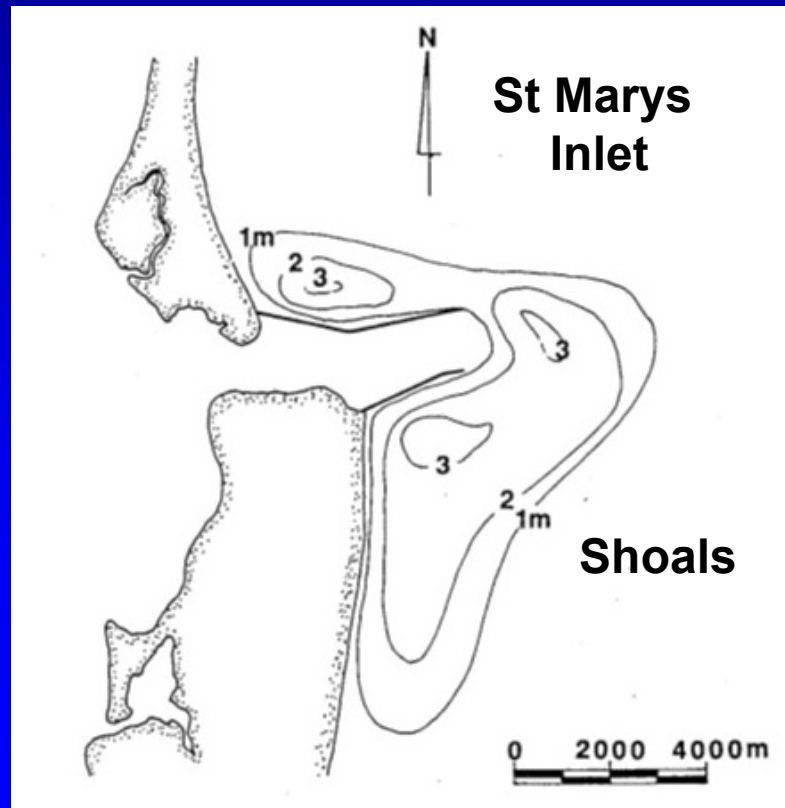


Not All Plans Meet Goals



Inlet Management Plans (IMPs)

- 25 unmanaged inlets - natural bypassing
- 25 managed inlets with IMPs
- There are 16 managed inlets without IMPs despite having 27 years to develop them!



Managed Inlets Without IMPs

Federally Funded Navigation Projects

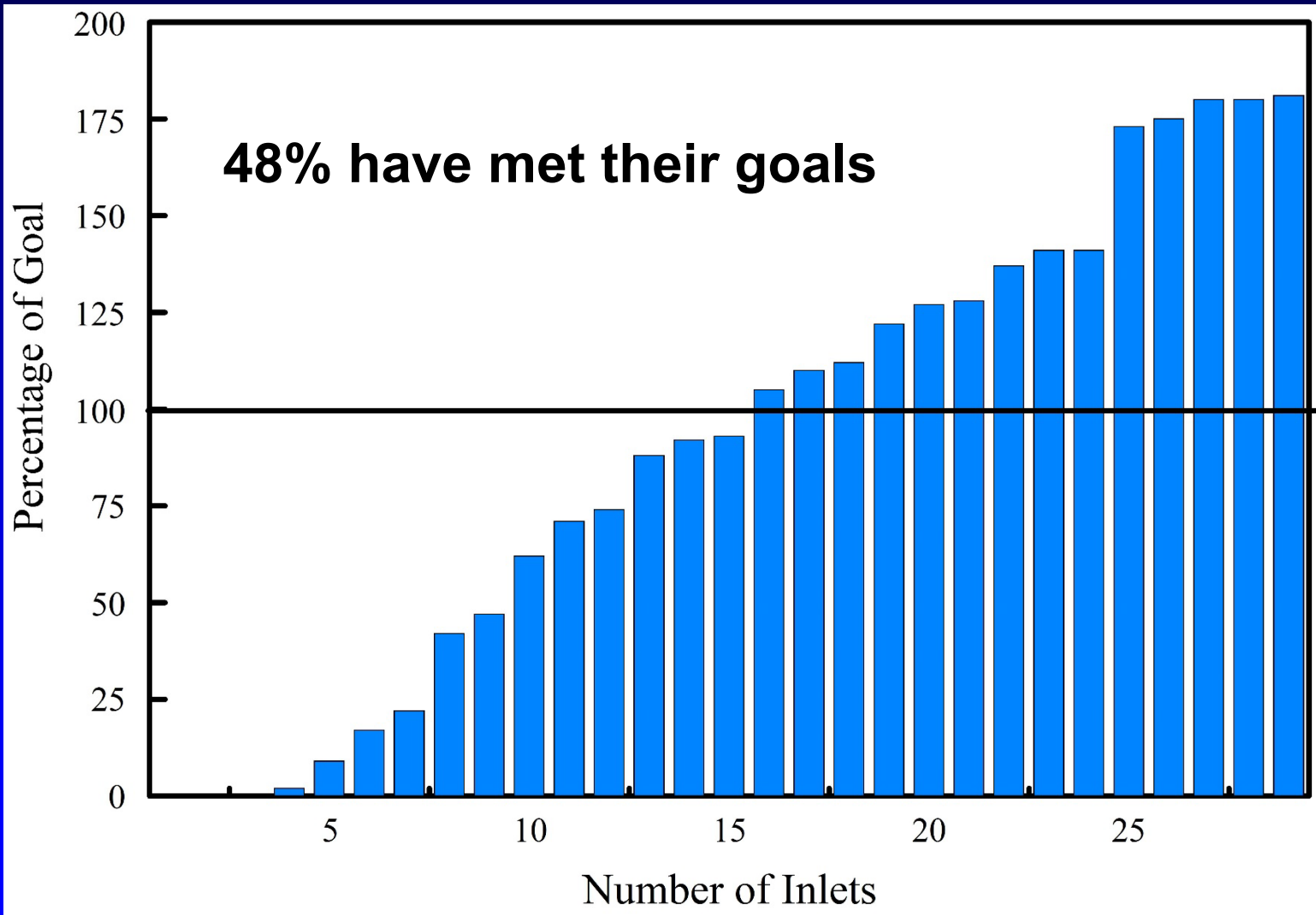
St Johns River Entrance
Government Cut
Pensacola Pass
St Andrews Inlet
Sikes Cut
Clearwater Pass
Egmont Channel
New Pass
Boca Grande Pass
Gordon Pass

Non-Federal

Mexico Beach Inlet
Hurricane Pass
Matanzas Pass
Big Carlos Pass
New Pass (Lee County)
Clam Pass

3. How Well Have IMPs Worked

- Percentages of IMP plans executed from signing to 2020



Percentages of IMP Plans Executed

Blind Pass N	0	Blind Pass S	0	Pass-a-Grille N	0
Venice S	2	Ft Pierce	9	P. Everglades S	17
St Marys	22	Longboat S	42	St Augustine N	47
Sebastian	62	Jupiter S	71	Stump Pass S	74
Doctors Pass S	74	Hillsboro	92	Mexico Beach E	93
St Augustine S	105	S Lake Worth S	110	Boca Raton	112
Blind Pass S	122	Lake Worth S	127	St Lucie Inlet S	128
Ponce de Leon	137	Port Canaveral	141	Bakers Haulover	141
Wiggins S	173	Johns Pass	175	St Lucie N	180
Stump Pass	180	Wiggins N	181		

Some inlets have north, south, and east (S,N,E) bypass plans
 The first Blind Pass is in Lee County and the second in Pinellas County

Problem – What is Meant by Inlet Bypassing?

Florida Statute 161.142 in 1986

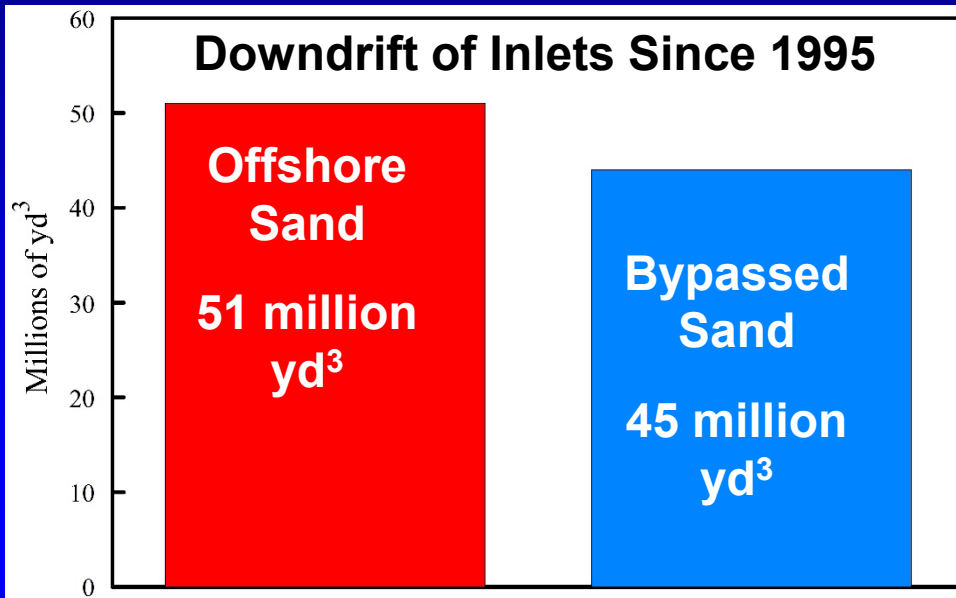
“... it is in the public interest to **replicate the natural drift of sand** which is **interrupted or altered by inlets** and for each level of government to undertake all reasonable efforts to maximize **inlet sand bypassing**”

- Inlet sand bypassing is replicating the natural drift of sand interrupted by inlets
- Achieved by moving sand from updrift beaches, channels, or active shoals to downdrift beaches
- Bypassing is not moving offshore sand that is not in the littoral system to beaches – that is beach nourishment



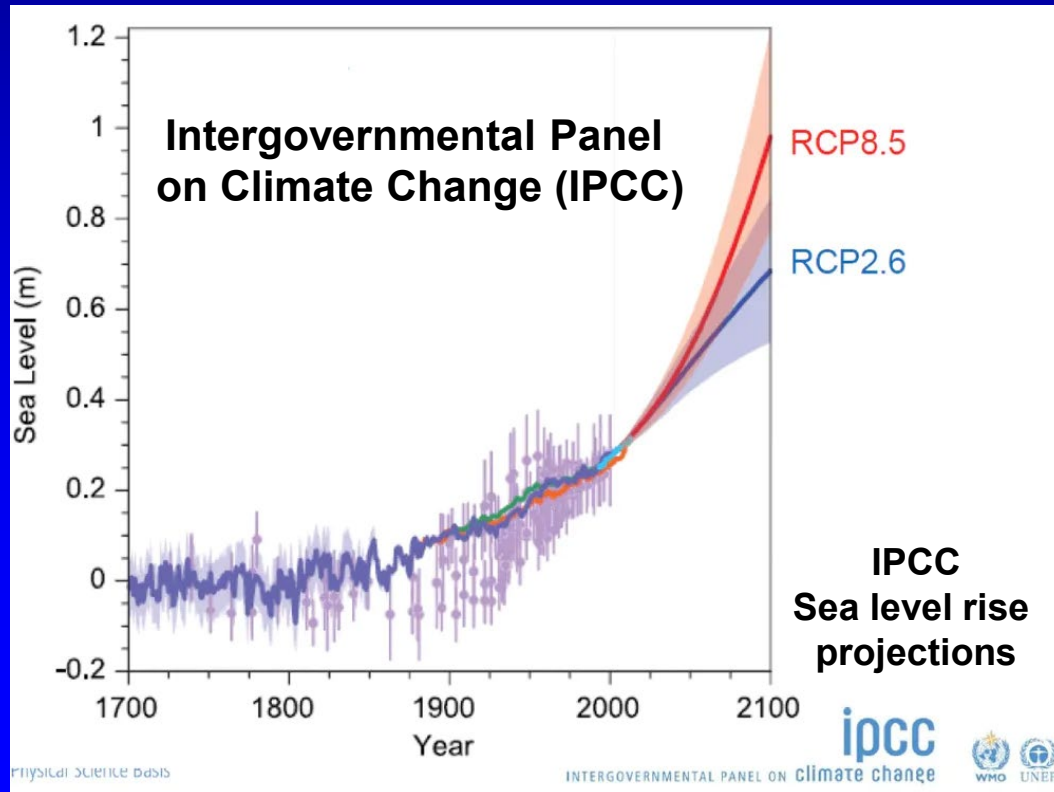
Bypassed Versus Offshore Sand

- At inlets without IMPs, 33 million yd^3 of offshore sand was placed downdrift since 1995
- At inlets with IMPs, 18 million yd^3 of offshore sand was placed downdrift to make up for shortfalls in bypassing



Sand Needed to Offset Future Sea Level Rise

- If we continue for the next 25 years what we did the last 25 years, we will have used up ~ 100 million yd³ of offshore sand since 1995
- But Florida needs 40-80 million yd³ over the next 25 years just to offset sea level rise (Using IPCC 2021)

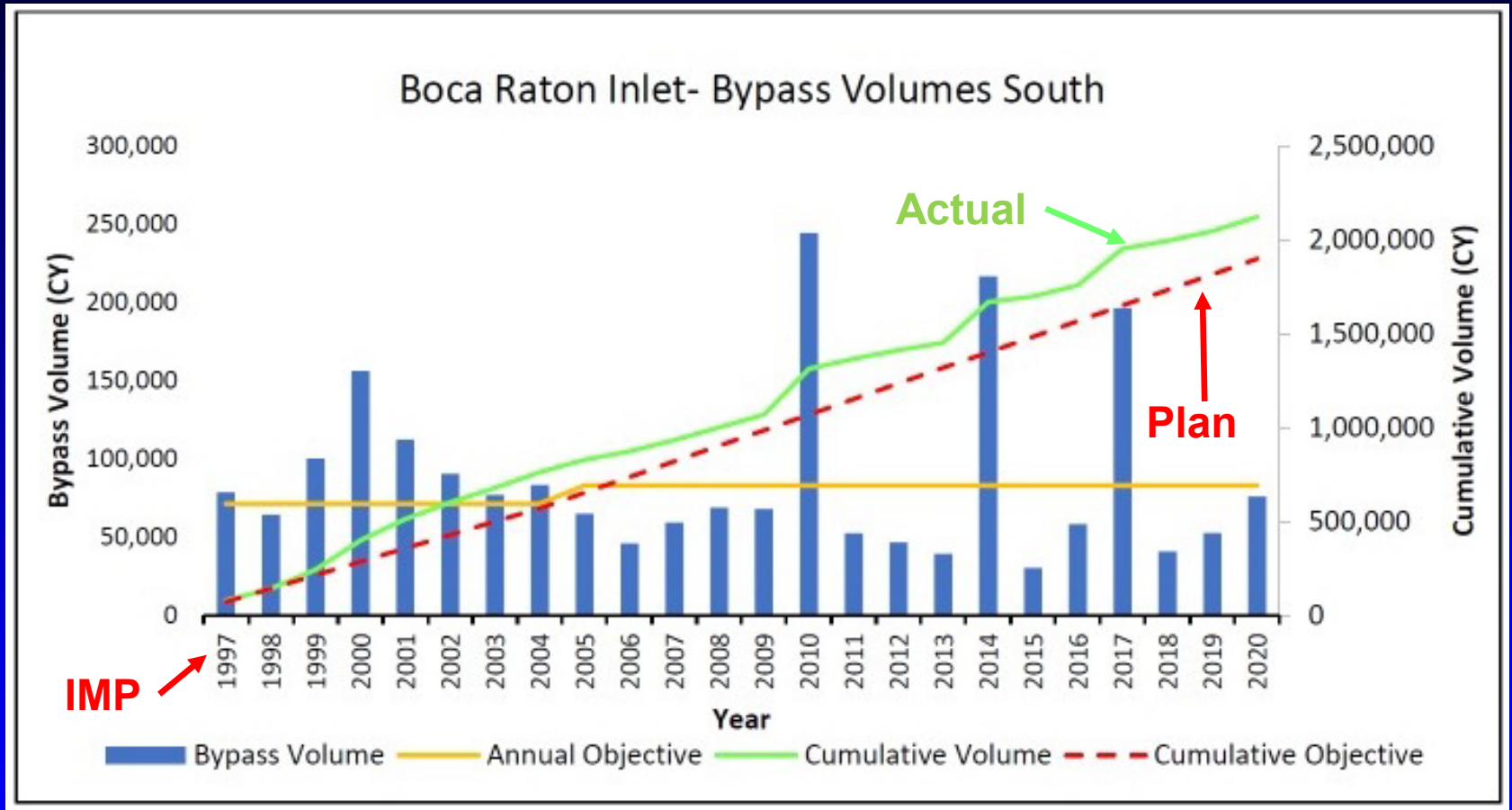


Examples of What is Correctly Being Done

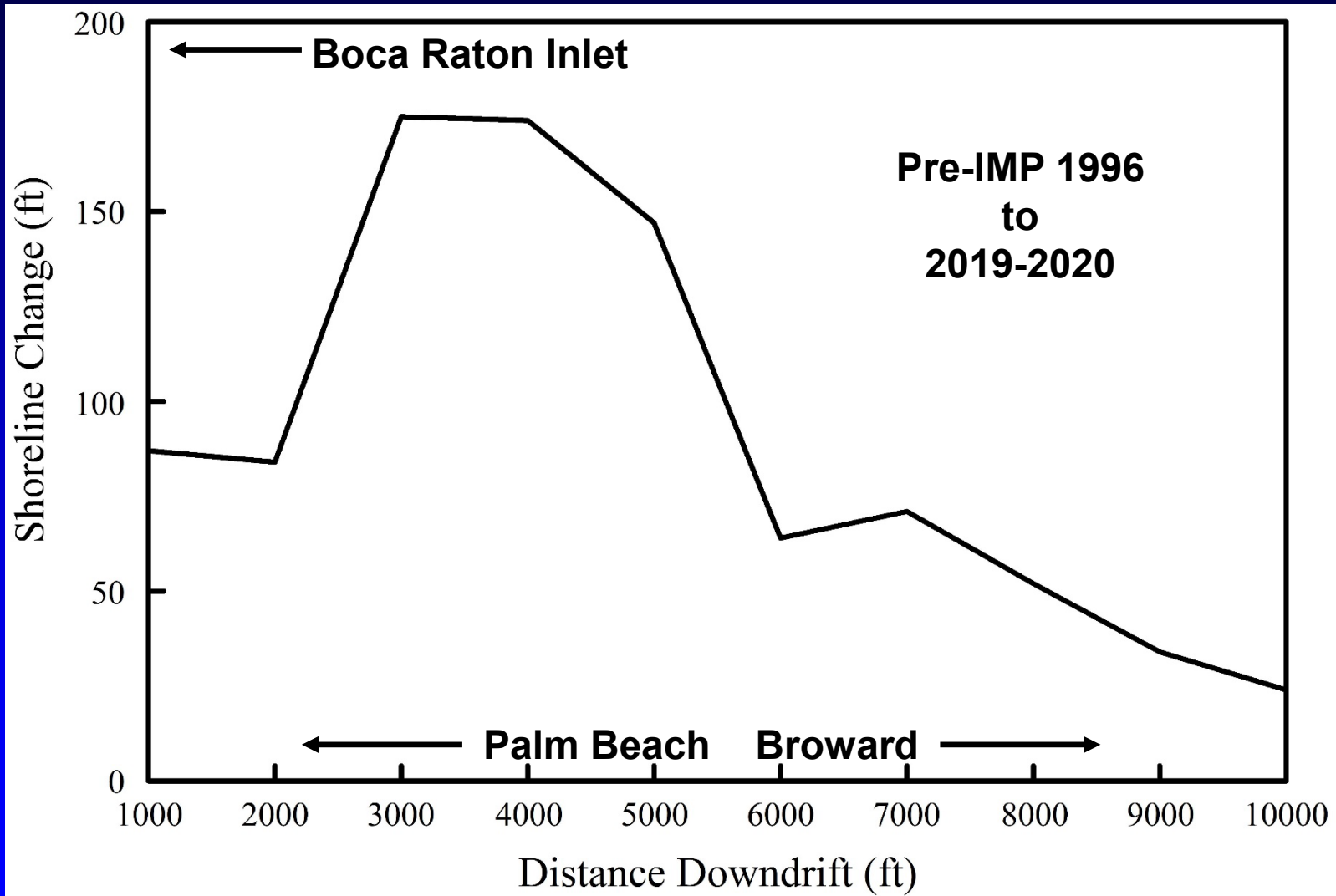


Boca Raton Inlet IMP 1997

Actual

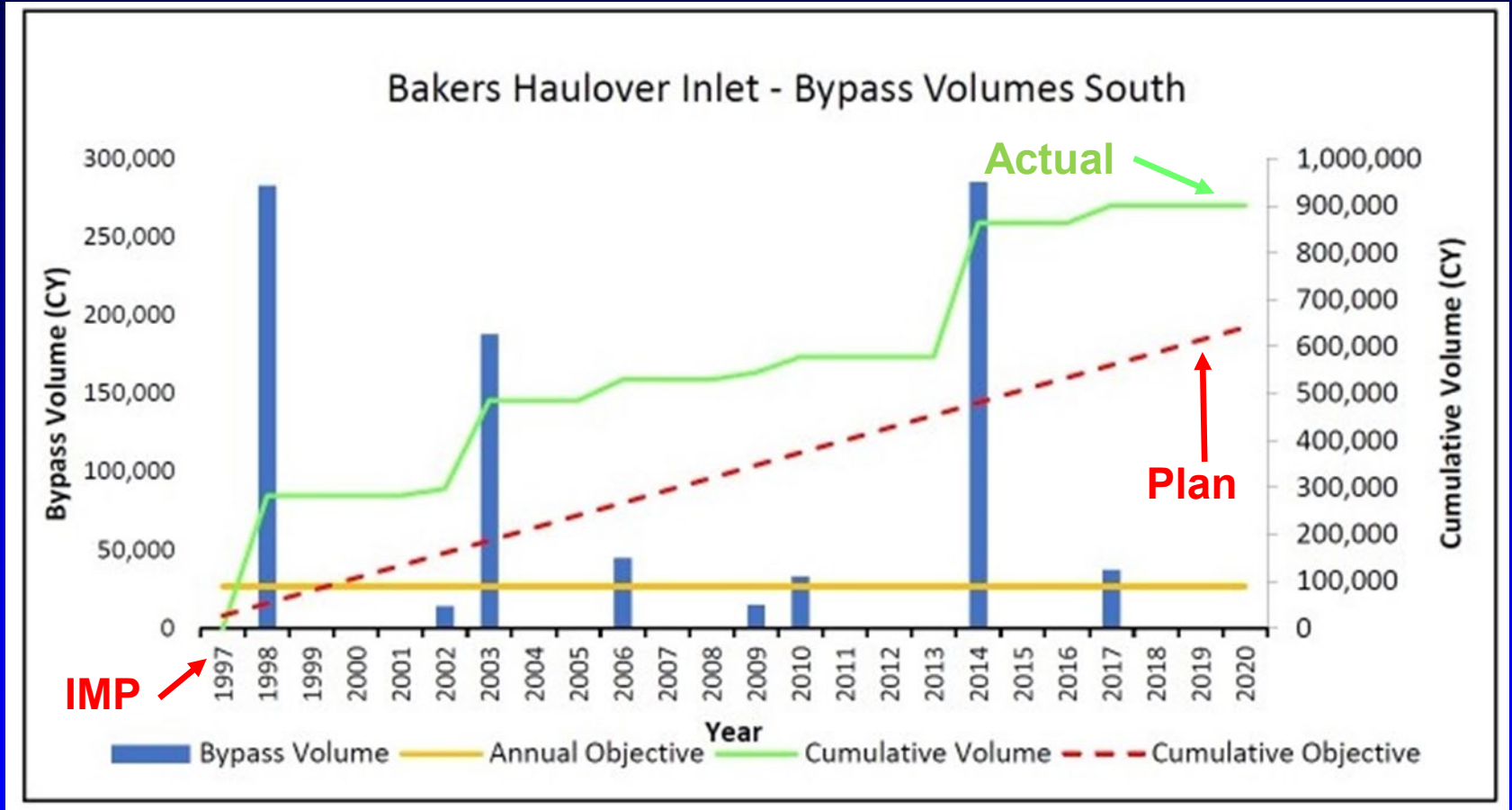


Boca Raton Downdrift Shoreline Change

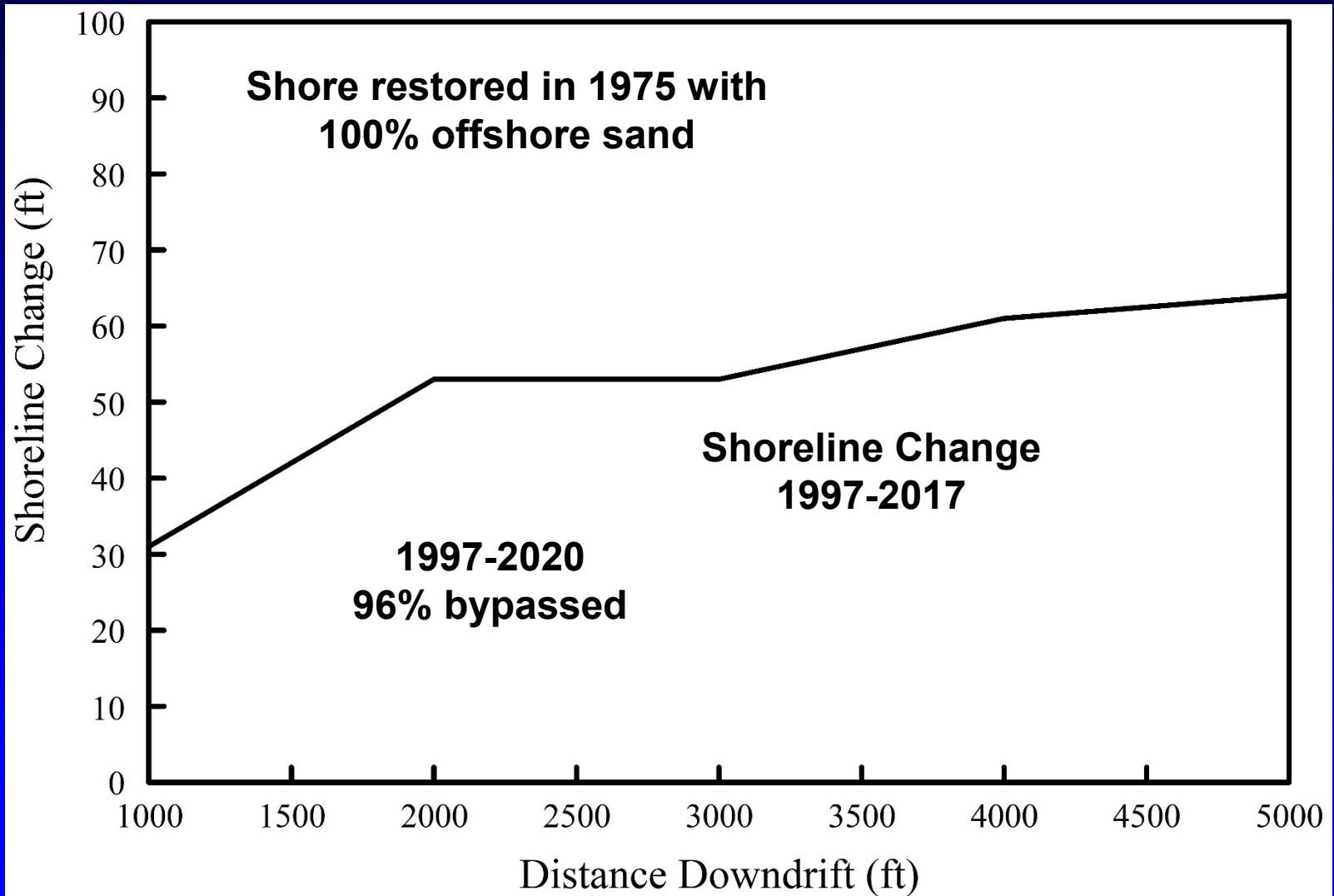


Bakers Haulover Inlet IMP 1997

Actual

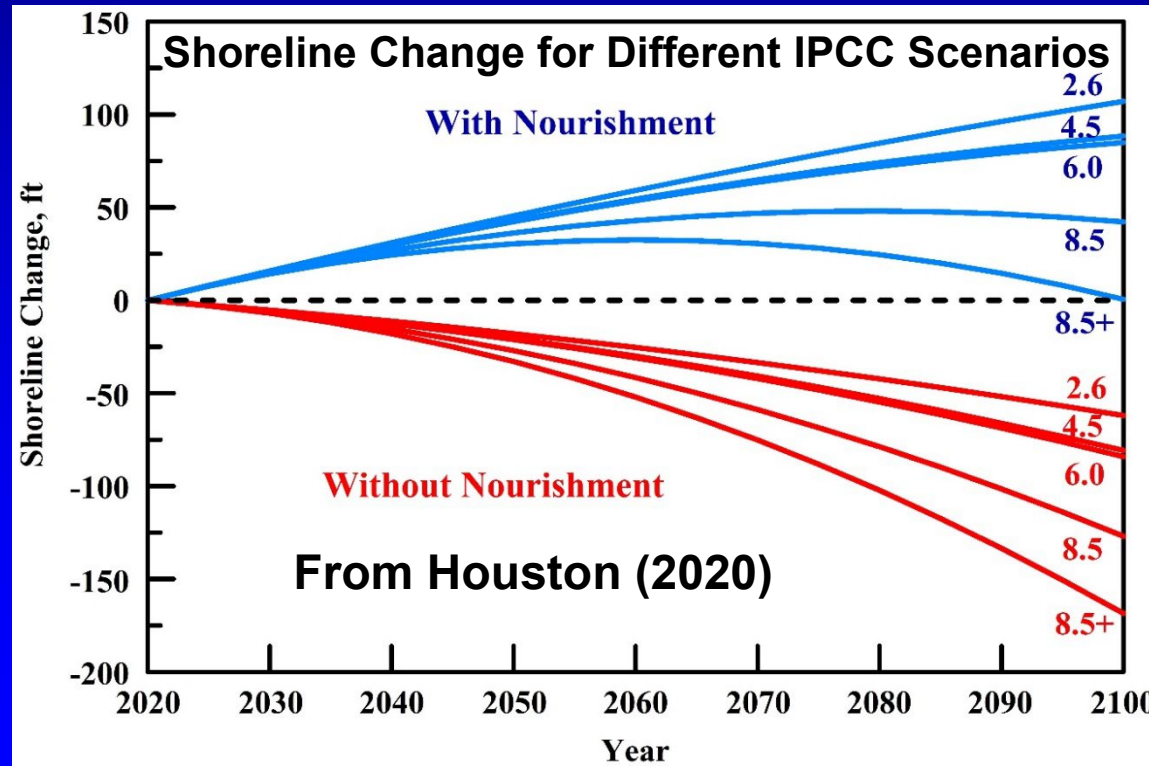


Bakers Haulover Downtdrift Change



Beach Nourishment is Critical to Florida

- Without it, shorelines will recede for even the most benign sea level rise scenario of the Intergovernmental Panel on Climate Change
- With it, shorelines will advance even for the worst sea level rise scenario - but only if there is sufficient sand



We Need to Restore the Balance



“Reinstate the natural flow. Sand went around inlets before the channels were dredged and the jetties were built”

- Bob Dean, 1987

These Inlets Need IMPs

- 27 years have passed – it is high time
- Florida and feds need to get together on inlets with federally funded navigation projects without IMPs



Federal

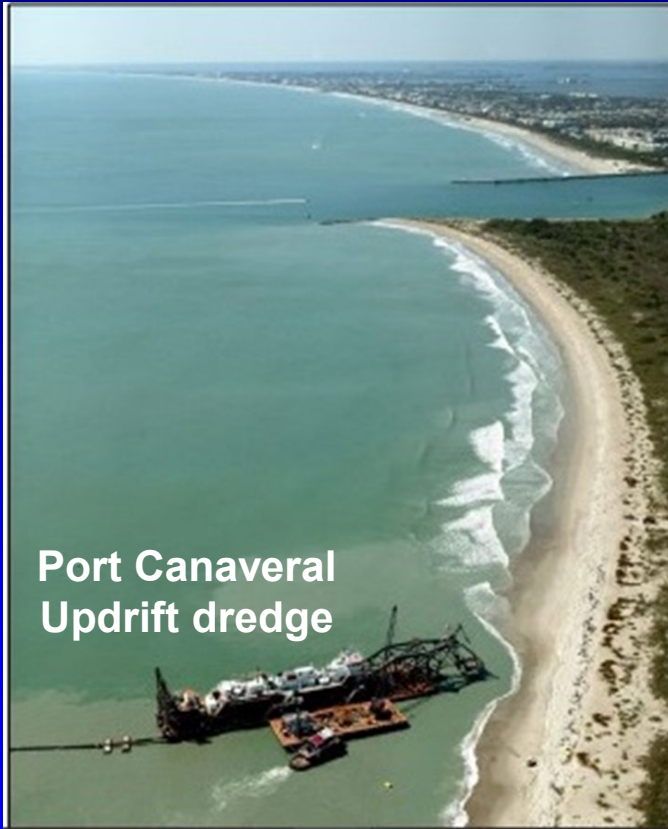
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IMP Goals Need to be Met

- The intent of the State Statute is inlet bypassing
- Bypassing goals need to be met before using offshore sand as a supplement to bypassing



Conclusions

- Inlet bypassing is a key to sustainable Florida shorelines
- All managed inlets should have IMPs to restore the natural balance that existed before they were modified for navigation
- IMP goals should be met before placing offshore sand downdrift from inlets



**From my days as an
undergrad at Berkeley,
and paraphrasing the
words of John Lennon,**



**From my days as an
undergrad at Berkeley,
and paraphrasing the
words of John Lennon,
“All that we’re saying,
is give bypassing a chance”**



The End

