

REEF RESILIENCE CONFERENCE 2008: RESILIENCE STRATEGIES

How to read this document:

This document contains the results of small group discussions and voting for resilience strategies that took place on day two of the Conference.

In the small group discussions, a number of pre-identified management strategies were discussed, additions or amendments were recorded, and each participant was given five votes for the strategy or strategies that they believed would have the greatest positive impact on reef resilience. The results are presented in the following pages in 3 different ways; each in a section of its own as identified by yellow highlighted bands.

1st. Section "Votes for Strategies as Recorded"

Strategies are grouped into general & sub-categories and displayed in the order they were presented to the groups. Strategies not on the original list or amendments to original strategies are in blue. Votes for each item are shown to the right.

2nd. Section "All Strategies Ranked from Most Votes to Least"

Strategies are ranked in voting order (descending) regardless of which category or sub-category they were originally found in. Strategies not on the original list or amendments to original strategies are in blue.

3rd. Section "Strategies Ranked within Sub-Categories"

Categories and sub-categories are displayed in the order they were presented to the groups. All items are listed in voting order (descending) under the appropriate strategy, general and sub-category. Strategies not on the original list or amendments to original strategies are in blue.

Key to General & sub-category codes:

EOAA	Education, Outreach, Awareness and Appreciation Strategies
Themes	Incorporate four key communication themes, and more specific messages aligned with them, into the full spectrum of existing communication vehicles
Audience	Audiences for these communications
Vehicles	Potential Communication vehicles
R & M	Potential Research & monitoring strategies
BRP	Formalize and implement the "South Florida Coral Bleaching Response Plan" (BRP)
Monitoring	Better integrate Disturbance Response Monitoring (DRM) monitoring with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system
Analysis	Better integrate DRM analysis with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system
Vol BPs	Potential Voluntary "Best Reef Use Practices" Strategies
BPs All	Best Practices for all reef users
BPs dive	Best Practices for diving
BPs fish	Best Practices for fishing on or near reefs
M w/o Reg	Potential Management Strategies that do not Require New Regulation
Gen mgmt	Potential general management strategies
Fish mgmt	Potential fishing management strategies
Regulatory	Potential Regulatory Strategies
Gen. regs.	Potential general regulatory strategies
Tour. Regs.	Potential tourism-oriented regulatory strategies
Zone Regs.	Potential zoning-oriented strategies
Const. Regs.	Potential coastal construction-oriented regulatory strategies
WQ Regs.	Potential water quality-oriented regulatory strategies
LE Regs.	Potential law enforcement strategies

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General Category	Sub-category	Votes for Strategies as Recorded	Votes
EOAA		Potential Education, Outreach, Awareness and Appreciation Strategies	
EOAA	Themes	Incorporate four key communication themes, and more specific messages aligned with them, into the full spectrum of existing communication vehicles	
EOAA	Themes	Theme 1: Coral reefs are natural marvels that are vital to Florida's environment, culture and economy	12
EOAA	Themes	Theme 2: Over the long-term, global climate change is the largest threat to coral reefs and the services that they provide to people because it affects reefs worldwide and may make other localized threats even more harmful	32
EOAA	Themes	Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now.	34
EOAA	Themes	Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	9
EOAA	Themes	Combined - Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now & Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	2
EOAA	Themes	Theme 5: Shifting Baselines - emphasize what we have lost vs what is left to build support for protection and restoration for the future	4
EOAA	Themes	Focus on the bigger picture - alternative energy, lower carbon footprint	19
EOAA	Themes	So we can give hope and responsibility - why is it important and why should we care	3
EOAA	Themes	So we can give hope and responsibility - develop nationwide climate change education	3
EOAA	Themes	Create understanding of mainland Southeast Florida's reef area	3
EOAA	Themes	Provide financial incentive (5% off) on dive trip if they take reef use test	5
EOAA	Audience	Audiences for these communications should include;	
EOAA	Audience	Students of all ages	35
EOAA	Audience	Direct coral reef users (e.g. reef fishers and divers) & snorkelers	16
EOAA	Audience	Visitors/tourists to coral reef areas	17
EOAA	Audience	Tourism development councils and chambers of commerce	15
EOAA	Audience	People whose local actions indirectly influence reefs (e.g. boaters, homeowners, etc. in South Florida)	15
EOAA	Audience	People whose regional actions indirectly influence reefs (e.g. people in the Mississippi river watershed)	7
EOAA	Audience	People whose remote actions indirectly influence reefs (e.g. greenhouse gas emitters everywhere)	6
EOAA	Audience	Policy makers. They have the power.	38
EOAA	Audience	Reef managers & staff	1
EOAA	Audience	Educators	4
EOAA	Audience	Researchers partner with classrooms	0
EOAA	Audience	Operators	0
EOAA	Audience	Disengaged people	2
EOAA	Audience	Consider demographics & age	3
EOAA	Audience	Operators get to more people	0

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EOAA	Vehicles	Potential communication vehicles	
EOAA	Vehicles	Create a sticker for SCUBA tanks, tackle boxes, etc. illustrating good and bad reef practices	3
EOAA	Vehicles	Create stickers, key chains, etc. for boats with proper law enforcement numbers to call for specific violations	1
EOAA	Vehicles	Create an educational product (e.g. booklet, CD and/or website) with comprehensive information about reef use in an area (Keys or mainland) that would be readily available everywhere in south Florida. ITS ALL ONE RESOURCE	13
EOAA	Vehicles	Create a "shame website" to list violators & post photos of them breaking the law	6
EOAA	Vehicles	Incorporate general climate change and specific reef impact information into school science curricula	24
EOAA	Vehicles	Utilize volunteer programs to help distribute messages	6
EOAA	Vehicles	Integrate communication and education about climate change and coral bleaching into existing communication plans	12
EOAA	Vehicles	Distribute messages via dive shops and tackle shops by enlisting owners and staff	21
EOAA	Vehicles	Literature and other materials from tourism development councils and chambers of commerce	2
EOAA	Vehicles	Create an interactive website of bleaching and other marine phenomena reports that dive operators can check (like checking the weather) for areas to avoid due to bleaching.	8
EOAA	Vehicles	Create market messaging at all levels and all languages	5
EOAA	Vehicles	TV PSAs stories interesting	7
EOAA	Vehicles	Billboard or signage indicating you are in a NMS or coral reef sensitive area	9
EOAA	Vehicles	Broad web presence	9
EOAA	Vehicles	Incorporate kids in the process and projects K-12 & bilingual, e.g.. Ken's bringing students to farm	12
EOAA	Vehicles	YMCA groups	0
EOAA	Vehicles	Teacher workgroups	0
EOAA	Vehicles	Music through the reef - communicate through music, "concert"	1
EOAA	Vehicles	Google earth/Google ocean case studies	2
EOAA	Vehicles	Provide opportunity for reef users to learn about resource before use	3
EOAA	Vehicles	Reef flyer in water bill	1
EOAA	Vehicles	Blue star developed by dive community	1
EOAA	Vehicles	Forming local info sharing groups	1
EOAA	Vehicles	Reef week festival type events	3
EOAA	Vehicles	Trade publications, scuba diving magazine	0
EOAA	Vehicles	Personalized outreach	0
EOAA	Vehicles	Grassroots advocacy campaign	2
EOAA	Vehicles	Media	5
EOAA	Vehicles	Use boaters and U.S. Coast Guard	0

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R and M		Potential Research and Monitoring Strategies	
R and M	BRP	Formalize and implement the "South Florida Coral Bleaching Response Plan" (BRP)	
R and M	BRP	Continue BleachWatch and expand to the mainland.	18
R and M	BRP	Continue Disturbance Response Monitoring (DRM, a.k.a "coral bleaching monitoring") and expand to Marquesas, Dry Tortugas, inter-island and backcountry zones of the Florida Keys and deep reef zones throughout south Florida	29
R and M	BRP	Formalize a follow-up DRM monitoring procedure to quantify impacts of severe bleaching events	9
R and M	BRP	Make DRM data and reports available online and incorporate into clearinghouse for metadata	12
R and M	BRP	Encourage dive tour operators and other groups & users to get involved in monitoring, Bleach Watch, MEERA etc. (possibly model on Great Barrier Reef's "Eyes on the Reef" program) and integrate these into a centralized, user-friendly reporting system	44
R and M	BRP	Adapt DRM for non-bleaching disturbances including (e.g. algal blooms, oil spills, hurricanes, cold snaps)	14
R and M	BRP	No fee permit for reporting research	0
R and M	BRP	Credit course for monitoring support at community college/high school	1
R and M	BRP	Create a dive specialty (education course)	4
R and M	BRP	Blue star ranking if they (operators) participate in activities	2
R and M	Monitoring	Better integrate DRM <u>monitoring</u> with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system	
R and M	Monitoring	Optimize cost:benefit and data compatibility among DRM and other ongoing benthic monitoring (e.g. CREMP, NURC, Coral Disease Cruise) to unify benthic monitoring	11
R and M	Monitoring	During DRM monitoring, collect samples for coral and zoox genetics, microbial associations, biomarkers and other relevant studies	18
R and M	Monitoring	Utilize DRM monitoring as a mechanism for ground-truthing benthic mapping	4
R and M	Monitoring	Continue collection of Diadema sea urchin data during DRM sampling	3
R and M	Monitoring	Begin sampling presence/absence of fishing gear during DRM monitoring (following NURC protocol for consistency)	5
R and M	Monitoring	Investigate impacts of ocean acidification by targeting inter-island zones as potentially representative of future conditions offshore (collaborate with UM)	8
R and M	Monitoring	Refine research questions linking human dimensions monitoring in time and space with biophysical monitoring for a holistic account of reef condition and perception of condition.	24
R and M	Monitoring	Increase compatibility of NOAA 50km and USF 1km remote sensing products with DRM results	2
R and M	Monitoring	Communicate \$\$ sources for research	0
R and M	Monitoring	Link research to management / synergy in research	0
R and M	Monitoring	SEAKEYS with other metrics for water quality monitoring (nitrogen, mercury)	2

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		Better integrate DRM <u>analysis</u> with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system	
R and M	Analysis		
R and M	Analysis	Examine coral population and disturbance response relationships to benthic community composition (collaborate with NURC, CREMP...).	11
R and M	Analysis	Examine coral population and disturbance response relationships to fish populations (collaborate with UM, FWC...)	11
R and M	Analysis	Develop connectivity research specific to post-disturbance recovery (collaborate with UM...)	6
R and M	Analysis	Continue examining relationships between local environmental conditions (e.g. UV/light, water quality, currents, doldrums, & other contaminants, etc.), biological & physical environment and bleaching to better understand reef resilience to climate change. Expand existing efforts focused on the Keys to the mainland	43
R and M	Analysis	Add strategic sampling sites near SEAKEYS monitoring sites and other permanent sensors	16
R and M	Analysis	Provide contextual information for other studies (e.g. CSREES and other Aquarius missions, staghorn coral nursery and restoration network, etc.)	3
R and M	Analysis	Conduct hind casting of past bleaching events using NOAA 50km and USF 1km remote sensing products to enhance forecasting capability	3
R and M	Analysis	Investigate small scale restoration options to establish feasibility and cost:benefit (e.g. shading)	19
R and M	Analysis	Regularly communicate analysis results to reef managers and the public to best address their needs	38
R and M	Analysis	Bigger scale actions- alternative energy	21
R and M	Analysis	Managers have system for engaging in research design	1
R and M	Analysis	Get baseline monitoring up north	8
R and M	Analysis	Regional network for sources and sinks	6
R and M	Analysis	Fine tune info for the audience	14
R and M	Analysis	Better understanding of factors limiting recovery processes for corals, esp. settlement of Acropora	11
R and M	Analysis	Design research to identify more sensitive indicators because corals respond slowly to stress & management	7
R and M	Analysis	Establish ecologically relevant, ie. Large, control areas to help distinguish climate from other stressors	4

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Vol. BPs		Potential Voluntary "Best Reef Use Practices" Strategies	
Vol. BPs	BP	Best Practices for all reef users	
Vol. BPs	BP	Avoid stressed/bleached/diseased coral reefs to reduce further negative impacts	17
Vol. BPs	BP	Use trip-rigged anchors and manual anchor placement in sand when and where conditions and safety considerations allow	12
Vol. BPs	BP	Notify trap fishermen/authorities of accidentally cut trap lines, ghost traps & gear via a new reporting system	8
Vol. BPs	BP	Significantly reduce greenhouse gas emissions through voluntary action of individuals, industries and governments	19
Vol. BPs	BP	Enhance communication between reef managers and commercial entities (divers and fishing) for best practices	9
Vol. BPs	BP	Reduce personal environmental impact	4
Vol. BPs	BP	Voluntary vessel monitoring/tracking on non-commercial fishing vessels to identify use patterns	3
Vol. BPs	BP	Shift effort to artificial reef during stressful periods	0
Vol. BPs	BP	Implement a user fee for all resource users with reef industry input into uses of fees	17
Vol. BPs	BP	Best Practices for diving	
Vol. BPs	BP	Blue Star: Dive and snorkel operators get certified, divers and snorkelers use certified operators. Includes environmental briefing and climate change briefing and general green practices.	42
Vol. BPs	BP	Dive tour operators conduct buoyancy control training/check out prior to taking divers to sensitive reefs. Avoid gauge dragging.	4
Vol. BPs	BP	Dive operators and divers point out inappropriate behaviors to their clients and peers	4
Vol. BPs	BP	Rotate use of different reefs to spread out any diving related impacts	6
Vol. BPs	BP	Focus use on specific reefs to concentrate diving related impacts	4
Vol. BPs	BP	Buoy licensing system/buy own private mooring buoy	7
Vol. BPs	BP	Good reef / bad reef dives to show impact	4
Vol. BPs	BP	Greener boating practices	3
Vol. BPs	BP	Best Practices for fishing on or near reefs	
Vol. BPs	BP	Structure fishing tournaments to minimize unnecessary take and resource damage	11
Vol. BPs	BP	Recreational anglers take only what they need and release the rest	8
Vol. BPs	BP	Keep lobster and crab traps away from living corals	44
Vol. BPs	BP	Remove lobster and crab traps from the water or from reef areas prior to severe storms	9
Vol. BPs	BP	Remove lobster and crab traps from minimally productive waters near coral reefs prior to official season end dates to avoid trap movement and coral damage during late winter storms	7
Vol. BPs	BP	Use the lowest impact fishing gear available	15
Vol. BPs	BP	Community cleanup after each season (all user groups & agencies)	7
Vol. BPs	BP	Community cleanup for lobster traps. Paperwork involved	0
Vol. BPs	BP	Best practices - mini lobster season and other high impact events. Don't flip coral heads	6
Vol. BPs	BP	Sustainably caught seafood promotion program	1
Vol. BPs	BP	Center of compatible tourism business development	2

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M w/o Reg		Potential Management Strategies that do not Require New Regulation	
M w/o Reg	Gen mgmt	Potential general management strategies	
M w/o Reg	Gen mgmt	Increase navigational aids for boaters (e.g. "danger shoal" marker at Looe Key)	24
M w/o Reg	Gen mgmt	Refine the mooring buoy system and expand it to places where mooring buoys are not yet used	14
M w/o Reg	Gen mgmt	Focus law enforcement effort on resilient reef areas and highly vulnerable but valuable reef areas	14
M w/o Reg	Gen mgmt	In the FKNMS, use existing authority to temporarily close highly stressed, bleached or diseased reefs	19
M w/o Reg	Gen mgmt	Provide feedback on Sambos research zone	2
M w/o Reg	Gen mgmt	Management zones on e-charts and paper charts	8
M w/o Reg	Gen mgmt	Temporal strategic signs about local reef condition	2
M w/o Reg	Gen mgmt	Mooring reservation system-have specific mooring buoys for commercial operators with fees	0
M w/o Reg	Fish mgmt	Potential fishing management strategies	
M w/o Reg	Fish mgmt	Reduce ghost traps by utilizing existing authority for fishermen and reef managers to remove them and to "deputize" others to do so under controlled circumstances	28
M w/o Reg	Fish mgmt	Develop a reporting system for boaters to notify trap fishermen/authorities of accidentally cut trap lines	6
M w/o Reg	Fish mgmt	Fully implement the lobster trap reduction plan	26
M w/o Reg	Fish mgmt	Sustainable practices	7
M w/o Reg	Fish mgmt	Encourage NGOs to buy back commercial fishermen (traps)	4
M w/o Reg	Fish mgmt	Move trapping season to outside hurricane season	4

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Regulatory		Potential Regulatory Strategies	
Regulatory	Gen. regs.	Potential general regulatory strategies	
Regulatory	Gen. regs.	Limit impact on select reef areas creating no anchor zones but providing moorings	3
Regulatory	Gen. regs.	Increase FKNMS "Area to be Avoided" status to cover mainland coral reefs with an appropriate buffer.	3
Regulatory	Gen. regs.	Do not rent boats to those with previous natural resource law violations	3
Regulatory	Gen. regs.	Discount boat insurance for those who complete boater education and environmental awareness program	5
Regulatory	Gen. regs.	Create a boating license similar to a driver's license	48
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure)	0
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure) to require operating experience for capt. (add enviro. education)	3
Regulatory	Gen. regs.	Place mainland coral reefs under the authority of a principl management agency/ authority/managed area	27
Regulatory	Gen. regs.	Rotate closures of reefs to allow recovery and spread impacts - longer term	5
Regulatory	Gen. regs.	Significantly reduce greenhouse gas emissions through regulation at municipal, county, state, national and international levels	35
Regulatory	Gen. regs.	Require fishing license for all marine fishing, increase fees to support enforcement/protection	1
Regulatory	Gen. regs.	Fishing regulations / lobster traps ban	7
Regulatory	Gen. regs.	Maintain the area of critical state concern designation	4
Regulatory	Gen. regs.	Allow law enforcement to write tickets for anchoring on coral	0
Regulatory	Gen. regs.	Increase penalties for breaking existing laws	1
Regulatory	Gen. regs.	Diving regulation - ban 2 day mini-season	1
Regulatory	Gen. regs.	Establish a carrying capacity quota. Buoys only	0
Regulatory	Gen. regs.	User fee for all reef users	37
Regulatory	Gen. regs.	Eliminate stone crab & lobster traps; dive for lobsters; legalize & regulate casitas	8
Regulatory	Gen. regs.	Fully implement lobster trap reduction & add reduction stone crabs	1
Regulatory	Tour. Regs.	Potential tourism-oriented regulatory strategies	
Regulatory	Tour. Regs.	Require commercial reef users who interface with visitors (e.g. dive tours, charter fishers, boat rental operations) to provide environmental education to users	15
Regulatory	Tour. Regs.	Require implementation of best practices for tourism as a condition of business licensing	8
Regulatory	Tour. Regs.	Require permitting for dive operators	1
Regulatory	Tour. Regs.	No live mounts of sharks	3
Regulatory	Tour. Regs.	User fee for visitors	10

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Regulatory	Zone Regs.	Potential zoning-oriented strategies	
Regulatory	Zone Regs.	Devise a comprehensive plan for marine zoning based on reef resilience principles, best available biophysical and social science and reef user input. Account for environmental protection and sustainability of commercial and recreational uses.	49
Regulatory	Const. Regs.	Potential coastal construction-oriented regulatory strategies	
Regulatory	Const. Regs.	Restrict or eliminate sediment-producing coastal construction during periods of high stress (e.g. late summer's coral bleaching season) or sensitivity (e.g. coral spawning and larval settlement periods).	9
Regulatory	Const. Regs.	No new dredging or other direct destruction of coral reef should be allowed	25
Regulatory	Const. Regs.	End/slow/find alternative to beach renourishment	9
Regulatory	Const. Regs.	Appropriately compensate for losses of reef ecosystem and economic services, (e.g. development & trap damage)	8
Regulatory	WQ Regs.	Potential water quality-oriented regulatory strategies	
Regulatory	WQ Regs.	Require centralized and on-site wastewater treatment systems to achieve Advanced Wastewater Treatment (AWT) standards	18
Regulatory	WQ Regs.	Require completion of storm water mitigation/treatment systems	7
Regulatory	WQ Regs.	Eliminate ocean wastewater outfalls in South Florida	21
Regulatory	WQ Regs.	Eliminate the availability and use persistent pesticides	1
Regulatory	WQ Regs.	Regulatory thresholds (e.g. for water pollution) should be set with climate change in mind as a predictable, growing stress. A margin of safety should be built in.	15
Regulatory	WQ Regs.	Where it is not already outlawed, outlaw discharge of wastewater from vessels in all state and federal waters supporting coral reef	2
Regulatory	WQ Regs.	Require pumpouts and impose fines for violations	5
Regulatory	LE Regs.	Potential law enforcement strategies	
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations	0
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations. Whistle blower policy	1
Regulatory	LE Regs.	Increase law enforcement presence in general and focus effort on resilient reef areas	39
Regulatory	LE Regs.	Provide dive operators with digital cameras to document violations	2
Regulatory	LE Regs.	Use undercover inspectors on dive boats to find safety or environmental violations	1
Regulatory	LE Regs.	Increase fishing & hunting fees to help fund natural resource law enforcement activities	2
Regulatory	LE Regs.	Fines for loose traps and other damage	0
Regulatory	LE Regs.	Legislative approval of money for law enforcement	1

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REEF RESILIENCE CONFERENCE 2008: RESILIENCE STRATEGIES			
General Category	Sub-category	All Strategies Ranked from Most Votes to Least	Votes
Regulatory	Zone Regs.	Devise a comprehensive plan for marine zoning based on reef resilience principles, best available biophysical and social science and reef user input. Account for environmental protection and sustainability of commercial and recreational uses.	49
Regulatory	Gen. regs.	Create a boating license similar to a driver's license	48
R and M	BRP	Encourage dive tour operators and other groups & users to get involved in monitoring, Bleach Watch, MEERA etc. (possibly model on Great Barrier Reef's "Eyes on the Reef" program) and integrate these into a centralized, user-friendly reporting system	44
Vol. BPs	BPs fish	Keep lobster and crab traps away from living corals	44
R and M	Analysis	Continue examining relationships between local environmental conditions (e.g. UV/light, water quality, currents, doldrums, & other contaminants, etc.), biological & physical environment and bleaching to better understand reef resilience to climate change. Expand existing efforts focused on the Keys to the mainland	43
Vol. BPs	BPs dive	Blue Star: Dive and snorkel operators get certified, divers and snorkelers use certified operators. Includes environmental briefing and climate change briefing and general green practices.	42
Regulatory	LE Regs.	Increase law enforcement presence in general and focus effort on resilient reef areas	39
EOAA	Audience	Policy makers. They have the power.	38
R and M	Analysis	Regularly communicate analysis results to reef managers and the public to best address their needs	38
Regulatory	Gen. regs.	User fee for all reef users	37
EOAA	Audience	Students of all ages	35
Regulatory	Gen. regs.	Significantly reduce greenhouse gas emissions through regulation at municipal, county, state, national and international levels	35
EOAA	Themes	Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now.	34
EOAA	Themes	Theme 2: Over the long-term, global climate change is the largest threat to coral reefs and the services that they provide to people because it affects reefs worldwide and may make other localized threats even more harmful	32
R and M	BRP	Continue Disturbance Response Monitoring (DRM, a.k.a "coral bleaching monitoring") and expand to Marquesas, Dry Tortugas, inter-island and backcountry zones of the Florida Keys and deep reef zones throughout south Florida	29
M w/o Reg	Fish mgmt	Reduce ghost traps by utilizing existing authority for fishermen and reef managers to remove them and to "deputize" others to do so under controlled circumstances	28
Regulatory	Gen. regs.	Place mainland coral reefs under the authority of a principal management agency/ authority/managed area	27
M w/o Reg	Fish mgmt	Fully implement the lobster trap reduction plan	26
Regulatory	Const. Regs.	No new dredging or other direct destruction of coral reef should be allowed	25
EOAA	Vehicles	Incorporate general climate change and specific reef impact information into school science curricula	24
M w/o Reg	Gen mgmt	Increase navigational aids for boaters (e.g. "danger shoal" marker at Looe Key)	24
R and M	Monitoring	Refine research questions linking human dimensions monitoring in time and space with biophysical monitoring for a holistic account of reef condition and perception of condition.	24
EOAA	Vehicles	Distribute messages via dive shops and tackle shops by enlisting owners and staff	21
R and M	Analysis	Bigger scale actions- alternative energy	21
Regulatory	WQ Regs.	Eliminate ocean wastewater outfalls in South Florida	21

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EOAA	Themes	Focus on the bigger picture - alternative energy, lower carbon footprint	19
M w/o Reg	Gen mgmt	In the FKNMS, use existing authority to temporarily close highly stressed, bleached or diseased reefs	19
R and M	Analysis	Investigate small scale restoration options to establish feasibility and cost:benefit (e.g. shading)	19
Vol. BPs	BPs all	Significantly reduce greenhouse gas emissions through voluntary action of individuals, industries and governments	19
R and M	BRP	Continue BleachWatch and expand to the mainland.	18
R and M	Monitoring	During DRM monitoring, collect samples for coral and zoox genetics, microbial associations, biomarkers and other relevant studies	18
Regulatory	WQ Regs.	Require centralized and on-site wastewater treatment systems to achieve Advanced Wastewater Treatment (AWT) standards	18
EOAA	Audience	Visitors/tourists to coral reef areas	17
Vol. BPs	BPs all	Avoid stressed/bleached/diseased coral reefs to reduce further negative impacts	17
Vol. BPs	BPs all	Implement a user fee for all resource users with reef industry input into uses of fees	17
EOAA	Audience	Direct coral reef users (e.g. reef fishers and divers) & snorkelers	16
R and M	Analysis	Add strategic sampling sites near SEAKEYS monitoring sites and other permanent sensors	16
EOAA	Audience	Tourism development councils and chambers of commerce	15
EOAA	Audience	People whose local actions indirectly influence reefs (e.g. boaters, homeowners, etc. in South Florida)	15
Regulatory	Tour. Regs.	Require commercial reef users who interface with visitors (e.g. dive tours, charter fishers, boat rental operations) to provide environmental education to users	15
Regulatory	WQ Regs.	Regulatory thresholds (e.g. for water pollution) should be set with climate change in mind as a predictable, growing stress. A margin of safety should be built in.	15
Vol. BPs	BPs fish	Use the lowest impact fishing gear available	15
M w/o Reg	Gen mgmt	Refine the mooring buoy system and expand it to places where mooring buoys are not yet used	14
M w/o Reg	Gen mgmt	Focus law enforcement effort on resilient reef areas and highly vulnerable but valuable reef areas	14
R and M	Analysis	Fine tune info for the audience	14
R and M	BRP	Adapt DRM for non-bleaching disturbances including (e.g. algal blooms, oil spills, hurricanes, cold snaps)	14
EOAA	Vehicles	Create an educational product (e.g. booklet, CD and/or website) with comprehensive information about reef use in an area (Keys or mainland) that would be readily available everywhere in south Florida. ITS ALL ONE RESOURCE	13
EOAA	Themes	Theme 1: Coral reefs are natural marvels that are vital to Florida's environment, culture and economy	12
EOAA	Vehicles	Integrate communication and education about climate change and coral bleaching into existing communication plans	12
EOAA	Vehicles	Incorporate kids in the process and projects K-12 & bilingual, e.g.. Ken's bringing students to farm	12
Vol. BPs	BPs all	Use trip-rigged anchors and manual anchor placement in sand when and where conditions and safety considerations allow	12
R and M	Analysis	Examine coral population and disturbance response relationships to benthic community composition (collaborate with NURC, CREMP...).	11
R and M	Analysis	Examine coral population and disturbance response relationships to fish populations (collaborate with UM, FWC...)	11
R and M	Analysis	Better understanding of factors limiting recovery processes for corals, esp. settlement of Acropora	11
R and M	BRP	Make DRM data and reports available online	11
R and M	Monitoring	Optimize cost:benefit and data compatibility among DRM and other ongoing benthic monitoring (e.g. CREMP, NURC, Coral Disease Cruise) to unify benthic monitoring	11
Vol. BPs	BPs fish	Structure fishing tournaments to minimize unnecessary take and resource damage	11

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Regulatory	Tour. Regs.	User fee for visitors	10
EOAA	Themes	Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	9
EOAA	Vehicles	Billboard or signage indicating you are in a NMS or coral reef sensitive area	9
EOAA	Vehicles	Broad web presence	9
R and M	BRP	Formalize a follow-up DRM monitoring procedure to quantify impacts of severe bleaching events	9
Regulatory	Const. Regs.	Restrict or eliminate sediment-producing coastal construction during periods of high stress (e.g. late summer's coral bleaching season) or sensitivity (e.g. coral spawning and larval settlement periods).	9
Regulatory	Const. Regs.	End/slow/find alternative to beach renourishment	9
Vol. BPs	BPs all	Enhance communication between reef managers and commercial entities (divers and fishing) for best practices	9
Vol. BPs	BPs fish	Remove lobster and crab traps from the water or from reef areas prior to severe storms	9
EOAA	Vehicles	Create an interactive website of bleaching and other marine phenomena reports that dive operators can check (like checking the weather) for areas to avoid due to bleaching.	8
M w/o Reg	Gen mgmt	Management zones on e-charts and paper charts	8
R and M	Analysis	Get baseline monitoring up north	8
R and M	Monitoring	Investigate impacts of ocean acidification by targeting inter-island zones as potentially representative of future conditions offshore (collaborate with UM)	8
Regulatory	Const. Regs.	Appropriately compensate for losses of reef ecosystem and economic services, (e.g. development & trap damage)	8
Regulatory	Gen. regs.	Eliminate stone crab & lobster traps; dive for lobsters; legalize & regulate casitas	8
Regulatory	Tour. Regs.	Require implementation of best practices for tourism as a condition of business licensing	8
Vol. BPs	BPs all	Notify trap fishermen/authorities of accidentally cut trap lines, ghost traps & gear via a new reporting system	8
Vol. BPs	BPs fish	Recreational anglers take only what they need and release the rest	8
EOAA	Audience	People whose regional actions indirectly influence reefs (e.g. people in the Mississippi river watershed)	7
EOAA	Vehicles	TV PSAs stories interesting	7
M w/o Reg	Fish mgmt	Sustainable practices	7
R and M	Analysis	Design research to identify more sensitive indicators because corals respond slowly to stress & management	7
Regulatory	Gen. regs.	Fishing regulations / lobster traps ban	7
Regulatory	WQ Regs.	Require completion of storm water mitigation/treatment systems	7
Vol. BPs	BPs dive	Buoy licensing system/buy own private mooring buoy	7
Vol. BPs	BPs fish	Remove lobster and crab traps from minimally productive waters near coral reefs prior to official season end dates to avoid trap movement and coral damage during late winter storms	7
Vol. BPs	BPs fish	Community cleanup after each season (all user groups & agencies)	7
EOAA	Audience	People whose remote actions indirectly influence reefs (e.g. greenhouse gas emitters everywhere)	6
EOAA	Vehicles	Create a "shame website" to list violators & post photos of them breaking the law	6
EOAA	Vehicles	Utilize volunteer programs to help distribute messages	6
M w/o Reg	Fish mgmt	Develop a reporting system for boaters to notify trap fishermen/authorities of accidentally cut trap lines	6
R and M	Analysis	Develop connectivity research specific to post-disturbance recovery (collaborate with UM...)	6
R and M	Analysis	Regional network for sources and sinks	6
Vol. BPs	BPs dive	Rotate use of different reefs to spread out any diving related impacts	6
Vol. BPs	BPs fish	Best practices - mini lobster season and other high impact events. Don't flip coral heads	6

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EOAA	Themes	Provide financial incentive (5% off) on dive trip if they take reef use test	5
EOAA	Vehicles	Create market messaging at all levels and all languages	5
EOAA	Vehicles	Media	5
R and M	Monitoring	Begin sampling presence/absence of fishing gear during DRM monitoring (following NURC protocol for consistency)	5
Regulatory	Gen. regs.	Discount boat insurance for those who complete boater education and environmental awareness program	5
Regulatory	Gen. regs.	Rotate closures of reefs to allow recovery and spread impacts - longer term	5
Regulatory	WQ Regs.	Require pumpouts and impose fines for violations	5
EOAA	Audience	Educators	4
EOAA	Themes	Theme 5: Shifting Baselines - emphasize what we have lost vs what is left to build support for protection and restoration for the future	4
M w/o Reg	Fish mgmt	Encourage NGOs to buy back commercial fishermen (traps)	4
M w/o Reg	Fish mgmt	Move trapping season to outside hurricane season	4
R and M	Analysis	Establish ecologically relevant, ie. Large, control areas to help distinguish climate from other stressors	4
R and M	BRP	Create a dive specialty (education course)	4
R and M	Monitoring	Utilize DRM monitoring as a mechanism for ground-truthing benthic mapping	4
Regulatory	Gen. regs.	Maintain the area of critical state concern designation	4
Vol. BPs	BPs all	Reduce personal environmental impact	4
Vol. BPs	BPs dive	Dive tour operators conduct buoyancy control training/check out prior to taking divers to sensitive reefs. Avoid gauge dragging.	4
Vol. BPs	BPs dive	Dive operators and divers point out inappropriate behaviors to their clients and peers	4
Vol. BPs	BPs dive	Focus use on specific reefs to concentrate diving related impacts	4
Vol. BPs	BPs dive	Good reef / bad reef dives to show impact	4
EOAA	Audience	Consider demographics & age	3
EOAA	Themes	So we can give hope and responsibility - why is it important and why should we care	3
EOAA	Themes	So we can give hope and responsibility - develop nationwide climate change education	3
EOAA	Themes	Create understanding of mainland Southeast Florida's reef area	3
EOAA	Vehicles	Create a sticker for SCUBA tanks, tackle boxes, etc. illustrating good and bad reef practices	3
EOAA	Vehicles	Provide opportunity for reef users to learn about resource before use	3
EOAA	Vehicles	Reef week festival type events	3
R and M	Analysis	Provide contextual information for other studies (e.g. CSREES and other Aquarius missions, staghorn coral nursery and restoration network, etc.)	3
R and M	Analysis	Conduct hind casting of past bleaching events using NOAA 50km and USF 1km remote sensing products to enhance forecasting capability	3
R and M	Monitoring	Continue collection of Diadema sea urchin data during DRM sampling	3
Regulatory	Gen. regs.	Limit impact on select reef areas creating no anchor zones but providing moorings	3
Regulatory	Gen. regs.	Increase FKNMS "Area to be Avoided" status to cover mainland coral reefs with an appropriate buffer.	3
Regulatory	Gen. regs.	Do not rent boats to those with previous natural resource law violations	3
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure) to require operating experience for capt. (add enviro. education)	3
Regulatory	Tour. Regs.	No live mounts of sharks	3
Vol. BPs	BPs all	Voluntary vessel monitoring/tracking on non-commercial fishing vessels to identify use patterns	3
Vol. BPs	BPs dive	Greener boating practices	3

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EOAA	Audience	Disengaged people	2
EOAA	Themes	Combined - Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now & Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	2
EOAA	Vehicles	Literature and other materials from tourism development councils and chambers of commerce	2
EOAA	Vehicles	Google earth/Google ocean case studies	2
EOAA	Vehicles	Grassroots advocacy campaign	2
M w/o Reg	Gen mgmt	Provide feedback on Sambos research zone	2
M w/o Reg	Gen mgmt	Temporal strategic signs about local reef condition	2
R and M	BRP	Blue star ranking if they (operators) participate in activities	2
R and M	Monitoring	Increase compatibility of NOAA 50km and USF 1km remote sensing products with DRM results	2
R and M	Monitoring	SEAKEYS with other metrics for water quality monitoring (nitrogen, mercury)	2
Regulatory	LE Regs.	Provide dive operators with digital cameras to document violations	2
Regulatory	LE Regs.	Increase fishing & hunting fees to help fund natural resource law enforcement activities	2
Regulatory	WQ Regs.	Where it is not already outlawed, outlaw discharge of wastewater from vessels in all state and federal waters supporting coral reef	2
Vol. BPs	BPs fish	Center of compatible tourism business development	2
EOAA	Audience	Reef managers & staff	1
EOAA	Vehicles	Create stickers, key chains, etc. for boats with law enforcement numbers to call for specific violations	1
EOAA	Vehicles	Music through the reef - communicate through music, "concert"	1
EOAA	Vehicles	Reef flyer in water bill	1
EOAA	Vehicles	Blue star developed by dive community	1
EOAA	Vehicles	Forming local info sharing groups	1
R and M	Analysis	Managers have system for engaging in research design	1
R and M	BRP	Credit course for monitoring support at community college/high school	1
Regulatory	Gen. regs.	Require fishing license for all marine fishing, increase fees to support enforcement/protection	1
Regulatory	Gen. regs.	Increase penalties for breaking existing laws	1
Regulatory	Gen. regs.	Diving regulation - ban 2 day mini-season	1
Regulatory	Gen. regs.	Fully implement lobster trap reduction & add reduction stone crabs	1
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations. Whistle blower policy	1
Regulatory	LE Regs.	Use undercover inspectors on dive boats to find safety or environmental violations	1
Regulatory	LE Regs.	Legislative approval of money for law enforcement	1
Regulatory	Tour. Regs.	Require permitting for dive operators	1
Regulatory	WQ Regs.	Eliminate the availability and use persistent pesticides	1
Vol. BPs	BPs fish	Sustainably caught seafood promotion program	1

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EOAA	Audience	Researchers partner with classrooms	0
EOAA	Audience	Operators	0
EOAA	Audience	Operators get to more people	0
EOAA	Vehicles	YMCA groups	0
EOAA	Vehicles	Teacher workgroups	0
EOAA	Vehicles	Trade publications, scuba diving magazine	0
EOAA	Vehicles	Personalized outreach	0
EOAA	Vehicles	Use boaters and U.S. Coast Guard	0
M w/o Reg	Gen mgmt	Mooring reservation system-have specific mooring buoys for commercial operators with fees	0
R and M	BRP	No fee permit for reporting research	0
R and M	Monitoring	Communicate \$\$ sources for research	0
R and M	Monitoring	Link research to management / synergy in research	0
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure)	0
Regulatory	Gen. regs.	Allow law enforcement to write tickets for anchoring on coral	0
Regulatory	Gen. regs.	Establish a carrying capacity quota. Buoys only	0
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations	0
Regulatory	LE Regs.	Fines for loose traps and other damage	0
Vol. BPs	BPs all	Shift effort to artificial reef during stressful periods	0
Vol. BPs	BPs fish	Community cleanup for lobster traps. Paperwork involved	0

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REEF RESILIENCE CONFERENCE 2008: RESILIENCE STRATEGIES			
General Category	Sub-category	Strategies Ranked within Sub-categories	Votes
EOAA		Potential Education, Outreach, Awareness and Appreciation Strategies	
EOAA	Themes	Incorporate four key communication themes, and more specific messages aligned with them, into the full spectrum of existing communication vehicles	
EOAA	Themes	Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now.	34
EOAA	Themes	Theme 2: Over the long-term, global climate change is the largest threat to coral reefs and the services that they provide to people because it affects reefs worldwide and may make other localized threats even more harmful	32
EOAA	Themes	Focus on the bigger picture - alternative energy, lower carbon footprint	19
EOAA	Themes	Theme 1: Coral reefs are natural marvels that are vital to Florida's environment, culture and economy	12
EOAA	Themes	Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	9
EOAA	Themes	Provide financial incentive (5% off) on dive trip if they take reef use test	5
EOAA	Themes	Theme 5: Shifting Baselines - emphasize what we have lost vs what is left to build support for protection and restoration for the future	4
EOAA	Themes	So we can give hope and responsibility - why is it important and why should we care	3
EOAA	Themes	So we can give hope and responsibility - develop nationwide climate change education	3
EOAA	Themes	Create understanding of mainland Southeast Florida's reef area	3
EOAA	Themes	Combined - Theme 3: Despite the very serious trouble that coral reefs are in today, there is reason to have hope for the future if we take action to increase reef resilience and decrease localized threats now & Theme 4: You can help protect Florida's reefs by taking the following actions (actions t.b.d by audience)	2
EOAA	Audience	Audiences for these communications should include;	
EOAA	Audience	Policy makers. They have the power.	38
EOAA	Audience	Students of all ages	35
EOAA	Audience	Visitors/tourists to coral reef areas	17
EOAA	Audience	Direct coral reef users (e.g. reef fishers and divers) & snorkelers	16
EOAA	Audience	Tourism development councils and chambers of commerce	15
EOAA	Audience	People whose local actions indirectly influence reefs (e.g. boaters, homeowners, etc. in South Florida)	15
EOAA	Audience	People whose regional actions indirectly influence reefs (e.g. people in the Mississippi river watershed)	7
EOAA	Audience	People whose remote actions indirectly influence reefs (e.g. greenhouse gas emitters everywhere)	6
EOAA	Audience	Educators	4
EOAA	Audience	Consider demographics & age	3
EOAA	Audience	Disengaged people	2
EOAA	Audience	Reef managers & staff	1
EOAA	Audience	Researchers partner with classrooms	0
EOAA	Audience	Operators	0
EOAA	Audience	Operators get to more people	0

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EOAA	Vehicles	Potential communication vehicles	
EOAA	Vehicles	Incorporate general climate change and specific reef impact information into school science curricula	24
EOAA	Vehicles	Distribute messages via dive shops and tackle shops by enlisting owners and staff	21
EOAA	Vehicles	Create an educational product (e.g. booklet, CD and/or website) with comprehensive information about reef use in an area (Keys or mainland) that would be readily available everywhere in south Florida. ITS ALL ONE RESOURCE	13
EOAA	Vehicles	Integrate communication and education about climate change and coral bleaching into existing communication plans	12
EOAA	Vehicles	Incorporate kids in the process and projects K-12 & bilingual, e.g.. Ken's bringing students to farm	12
EOAA	Vehicles	Billboard or signage indicating you are in a NMS or coral reef sensitive area	9
EOAA	Vehicles	Broad web presence	9
EOAA	Vehicles	Create an interactive website of bleaching and other marine phenomena reports that dive operators can check (like checking the weather) for areas to avoid due to bleaching.	8
EOAA	Vehicles	TV PSAs stories interesting	7
EOAA	Vehicles	Create a "shame website" to list violators & post photos of them breaking the law	6
EOAA	Vehicles	Utilize volunteer programs to help distribute messages	6
EOAA	Vehicles	Create market messaging at all levels and all languages	5
EOAA	Vehicles	Media	5
EOAA	Vehicles	Create a sticker for SCUBA tanks, tackle boxes, etc. illustrating good and bad reef practices	3
EOAA	Vehicles	Provide opportunity for reef users to learn about resource before use	3
EOAA	Vehicles	Reef week festival type events	3
EOAA	Vehicles	Literature and other materials from tourism development councils and chambers of commerce	2
EOAA	Vehicles	Google earth/Google ocean case studies	2
EOAA	Vehicles	Grassroots advocacy campaign	2
EOAA	Vehicles	Create stickers, key chains, etc. for boats with proper law enforcement numbers to call for specific violations	1
EOAA	Vehicles	Music through the reef - communicate through music, "concert"	1
EOAA	Vehicles	Reef flyer in water bill	1
EOAA	Vehicles	Blue star developed by dive community	1
EOAA	Vehicles	Forming local info sharing groups	1
EOAA	Vehicles	YMCA groups	0
EOAA	Vehicles	Teacher workgroups	0
EOAA	Vehicles	Trade publications, scuba diving magazine	0
EOAA	Vehicles	Personalized outreach	0
EOAA	Vehicles	Use boaters and U.S. Coast Guard	0

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R and M		Potential Research and Monitoring Strategies	
R and M	BRP	Formalize and implement the "South Florida Coral Bleaching Response Plan" (BRP)	
R and M	BRP	Encourage dive tour operators and other groups & users to get involved in monitoring, Bleach Watch, MEERA etc. (possibly model on Great Barrier Reef's "Eyes on the Reef" program) and integrate these into a centralized, user-friendly reporting system	44
R and M	BRP	Continue Disturbance Response Monitoring (DRM, a.k.a "coral bleaching monitoring") and expand to Marquesas, Dry Tortugas, inter-island and backcountry zones of the Florida Keys and deep reef zones throughout south Florida	29
R and M	BRP	Continue BleachWatch and expand to the mainland.	18
R and M	BRP	Adapt DRM for non-bleaching disturbances including (e.g. algal blooms, oil spills, hurricanes, cold snaps)	14
R and M	BRP	Make DRM data and reports available online and incorporate into clearinghouse for metadata	12
R and M	BRP	Formalize a follow-up DRM monitoring procedure to quantify impacts of severe bleaching events	9
R and M	BRP	Create a dive specialty (education course)	4
R and M	BRP	Blue star ranking if they (operators) participate in activities	2
R and M	BRP	Credit course for monitoring support at community college/high school	1
R and M	BRP	No fee permit for reporting research	0
R and M	Monitoring	Better integrate DRM monitoring with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system	
R and M	Monitoring	Refine research questions linking human dimensions monitoring in time and space with biophysical monitoring for a holistic account of reef condition and perception of condition.	24
R and M	Monitoring	During DRM monitoring, collect samples for coral and zoox genetics, microbial associations, biomarkers and other relevant studies	18
R and M	Monitoring	Optimize cost:benefit and data compatibility among DRM and other ongoing benthic monitoring (e.g. CREMP, NURC, Coral Disease Cruise) to unify benthic monitoring	11
R and M	Monitoring	Investigate impacts of ocean acidification by targeting inter-island zones as potentially representative of future conditions offshore (collaborate with UM)	8
R and M	Monitoring	Begin sampling presence/absence of fishing gear during DRM monitoring (following NURC protocol for consistency)	5
R and M	Monitoring	Utilize DRM monitoring as a mechanism for ground-truthing benthic mapping	4
R and M	Monitoring	Continue collection of Diadema sea urchin data during DRM sampling	3
R and M	Monitoring	Increase compatibility of NOAA 50km and USF 1km remote sensing products with DRM results	2
R and M	Monitoring	SEAKEYS with other metrics for water quality monitoring (nitrogen, mercury)	2
R and M	Monitoring	Communicate \$\$ sources for research	0
R and M	Monitoring	Link research to management / synergy in research	0

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R and M	Analysis	Better integrate DRM <u>analysis</u> with other ongoing and new research and monitoring to improve overall understanding of coral responses to stress and linkages to the south Florida socio-ecological system	
R and M	Analysis	Continue examining relationships between local environmental conditions (e.g. UV/light, water quality, currents, doldrums, & other contaminants, etc.), biological & physical environment and bleaching to better understand reef resilience to climate change. Expand existing efforts focused on the Keys to the mainland	43
R and M	Analysis	Regularly communicate analysis results to reef managers and the public to best address their needs	38
R and M	Analysis	Bigger scale actions- alternative energy	21
R and M	Analysis	Investigate small scale restoration options to establish feasibility and cost:benefit (e.g. shading)	19
R and M	Analysis	Add strategic sampling sites near SEAKEYS monitoring sites and other permanent sensors	16
R and M	Analysis	Fine tune info for the audience	14
R and M	Analysis	Examine coral population and disturbance response relationships to benthic community composition (collaborate with NURC, CREMP...).	11
R and M	Analysis	Examine coral population and disturbance response relationships to fish populations (collaborate with UM, FWC...)	11
R and M	Analysis	Better understanding of factors limiting recovery processes for corals, esp. settlement of Acropora	11
R and M	Analysis	Get baseline monitoring up north	8
R and M	Analysis	Design research to identify more sensitive indicators because corals respond slowly to stress & management	7
R and M	Analysis	Develop connectivity research specific to post-disturbance recovery (collaborate with UM...)	6
R and M	Analysis	Regional network for sources and sinks	6
R and M	Analysis	Establish ecologically relevant, ie. Large, control areas to help distinguish climate from other stressors	4
R and M	Analysis	Provide contextual information for other studies (e.g. CSREES and other Aquarius missions, staghorn coral nursery and restoration network, etc.)	3
R and M	Analysis	Conduct hind casting of past bleaching events using NOAA 50km and USF 1km remote sensing products to enhance forecasting capability	3
R and M	Analysis	Managers have system for engaging in research design	1

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Vol. BPs		Potential Voluntary "Best Reef Use Practices" Strategies	
Vol. BPs	BP's all	Best Practices for all reef users	
Vol. BPs	BP's all	Significantly reduce greenhouse gas emissions through voluntary action of individuals, industries and governments	19
Vol. BPs	BP's all	Avoid stressed/bleached/diseased coral reefs to reduce further negative impacts	17
Vol. BPs	BP's all	Implement a user fee for all resource users with reef industry input into uses of fees	17
Vol. BPs	BP's all	Use trip-rigged anchors and manual anchor placement in sand when and where conditions and safety considerations allow	12
Vol. BPs	BP's all	Enhance communication between reef managers and commercial entities (divers and fishing) for best practices	9
Vol. BPs	BP's all	Notify trap fishermen/authorities of accidentally cut trap lines, ghost traps & gear via a new reporting system	8
Vol. BPs	BP's all	Reduce personal environmental impact	4
Vol. BPs	BP's all	Voluntary vessel monitoring/tracking on non-commercial fishing vessels to identify use patterns	3
Vol. BPs	BP's all	Shift effort to artificial reef during stressful periods	0
Vol. BPs	BP's dive	Best Practices for diving	
Vol. BPs	BP's dive	Blue Star: Dive and snorkel operators get certified, divers and snorkelers use certified operators. Includes environmental briefing and climate change briefing and general green practices.	42
Vol. BPs	BP's dive	Buoy licensing system/buy own private mooring buoy	7
Vol. BPs	BP's dive	Rotate use of different reefs to spread out any diving related impacts	6
Vol. BPs	BP's dive	Dive tour operators conduct buoyancy control training/check out prior to taking divers to sensitive reefs. Avoid gauge dragging.	4
Vol. BPs	BP's dive	Dive operators and divers point out inappropriate behaviors to their clients and peers	4
Vol. BPs	BP's dive	Focus use on specific reefs to concentrate diving related impacts	4
Vol. BPs	BP's dive	Good reef / bad reef dives to show impact	4
Vol. BPs	BP's dive	Greener boating practices	3
Vol. BPs	BP's fish	Best Practices for fishing on or near reefs	
Vol. BPs	BP's fish	Keep lobster and crab traps away from living corals	44
Vol. BPs	BP's fish	Use the lowest impact fishing gear available	15
Vol. BPs	BP's fish	Structure fishing tournaments to minimize unnecessary take and resource damage	11
Vol. BPs	BP's fish	Remove lobster and crab traps from the water or from reef areas prior to severe storms	9
Vol. BPs	BP's fish	Recreational anglers take only what they need and release the rest	8
Vol. BPs	BP's fish	Remove lobster and crab traps from minimally productive waters near coral reefs prior to official season end dates to avoid trap movement and coral damage during late winter storms	7
Vol. BPs	BP's fish	Community cleanup after each season (all user groups & agencies)	7
Vol. BPs	BP's fish	Best practices - mini lobster season and other high impact events. Don't flip coral heads	6
Vol. BPs	BP's fish	Center of compatible tourism business development	2
Vol. BPs	BP's fish	Sustainably caught seafood promotion program	1
Vol. BPs	BP's fish	Community cleanup for lobster traps. Paperwork involved	0

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M w/o Reg		Potential Management Strategies that do not Require New Regulation	
M w/o Reg	Gen mgmt	Potential general management strategies	
M w/o Reg	Gen mgmt	Increase navigational aids for boaters (e.g. "danger shoal" marker at Looe Key)	24
M w/o Reg	Gen mgmt	In the FKNMS, use existing authority to temporarily close highly stressed, bleached or diseased reefs	19
M w/o Reg	Gen mgmt	Refine the mooring buoy system and expand it to places where mooring buoys are not yet used	14
M w/o Reg	Gen mgmt	Focus law enforcement effort on resilient reef areas and highly vulnerable but valuable reef areas	14
M w/o Reg	Gen mgmt	Management zones on e-charts and paper charts	8
M w/o Reg	Gen mgmt	Provide feedback on Sambos research zone	2
M w/o Reg	Gen mgmt	Temporal strategic signs about local reef condition	2
M w/o Reg	Gen mgmt	Mooring reservation system-have specific mooring buoys for commercial operators with fees	0
M w/o Reg	Fish mgmt	Potential fishing management strategies	
M w/o Reg	Fish mgmt	Reduce ghost traps by utilizing existing authority for fishermen and reef managers to remove them and to "deputize" others to do so under controlled circumstances	28
M w/o Reg	Fish mgmt	Fully implement the lobster trap reduction plan	26
M w/o Reg	Fish mgmt	Sustainable practices	7
M w/o Reg	Fish mgmt	Develop a reporting system for boaters to notify trap fishermen/authorities of accidentally cut trap lines	6
M w/o Reg	Fish mgmt	Encourage NGOs to buy back commercial fishermen (traps)	4
M w/o Reg	Fish mgmt	Move trapping season to outside hurricane season	4

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Regulatory		Potential Regulatory Strategies	
Regulatory	Gen. regs.	Potential general regulatory strategies	
Regulatory	Gen. regs.	Create a boating license similar to a driver's license	48
Regulatory	Gen. regs.	User fee for all reef users	37
Regulatory	Gen. regs.	Significantly reduce greenhouse gas emissions through regulation at municipal, county, state, national and international levels	35
Regulatory	Gen. regs.	Place mainland coral reefs under the authority of a principal management agency/ authority/managed area	27
Regulatory	Gen. regs.	Eliminate stone crab & lobster traps; dive for lobsters; legalize & regulate casitas	8
Regulatory	Gen. regs.	Fishing regulations / lobster traps ban	7
Regulatory	Gen. regs.	Discount boat insurance for those who complete boater education and environmental awareness program	5
Regulatory	Gen. regs.	Rotate closures of reefs to allow recovery and spread impacts - longer term	5
Regulatory	Gen. regs.	Maintain the area of critical state concern designation	4
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure) to require operating experience for capt. (add enviro. education)	3
Regulatory	Gen. regs.	Do not rent boats to those with previous natural resource law violations	3
Regulatory	Gen. regs.	Increase FKNMS "Area to be Avoided" status to cover mainland coral reefs with an appropriate buffer.	3
Regulatory	Gen. regs.	Limit impact on select reef areas creating no anchor zones but providing moorings	3
Regulatory	Gen. regs.	Diving regulation - ban 2 day mini-season	1
Regulatory	Gen. regs.	Fully implement lobster trap reduction & add reduction stone crabs	1
Regulatory	Gen. regs.	Increase penalties for breaking existing laws	1
Regulatory	Gen. regs.	Require fishing license for all marine fishing, increase fees to support enforcement/protection	1
Regulatory	Gen. regs.	Allow law enforcement to write tickets for anchoring on coral	0
Regulatory	Gen. regs.	Change US Coast Guard captain's licensing to be more stringent (presumably requiring more experience prior to licensure)	0
Regulatory	Gen. regs.	Establish a carrying capacity quota. Buoys only	0
Regulatory	Tour. Regs.	Potential tourism-oriented regulatory strategies	
Regulatory	Tour. Regs.	Require commercial reef users who interface with visitors (e.g. dive tours, charter fishers, boat rental operations) to provide environmental education to users	15
Regulatory	Tour. Regs.	User fee for visitors	10
Regulatory	Tour. Regs.	Require implementation of best practices for tourism as a condition of business licensing	8
Regulatory	Tour. Regs.	No live mounts of sharks	3
Regulatory	Tour. Regs.	Require permitting for dive operators	1
Regulatory	Zone Regs.	Potential zoning-oriented strategies	
Regulatory	Zone Regs.	Devise a comprehensive plan for marine zoning based on reef resilience principles, best available biophysical and social science and reef user input. Account for environmental protection and sustainability of commercial and recreational uses.	49

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Regulatory	Const. Regs.	Potential coastal construction-oriented regulatory strategies	
Regulatory	Const. Regs.	No new dredging or other direct destruction of coral reef should be allowed	25
Regulatory	Const. Regs.	End/slow/find alternative to beach renourishment	9
Regulatory	Const. Regs.	Restrict or eliminate sediment-producing coastal construction during periods of high stress (e.g. late summer's coral bleaching season) or sensitivity (e.g. coral spawning and larval settlement periods).	9
Regulatory	Const. Regs.	Appropriately compensate for losses of reef ecosystem and economic services, (e.g. development & trap damage)	8
Regulatory	WQ Regs.	Potential water quality-oriented regulatory strategies	
Regulatory	WQ Regs.	Eliminate ocean wastewater outfalls in South Florida	21
Regulatory	WQ Regs.	Require centralized and on-site wastewater treatment systems to achieve Advanced Wastewater Treatment (AWT) standards	18
Regulatory	WQ Regs.	Regulatory thresholds (e.g. for water pollution) should be set with climate change in mind as a predictable, growing stress. A margin of safety should be built in.	15
Regulatory	WQ Regs.	Require completion of storm water mitigation/treatment systems	7
Regulatory	WQ Regs.	Require pumpouts and impose fines for violations	5
Regulatory	WQ Regs.	Where it is not already outlawed, outlaw discharge of wastewater from vessels in all state and federal waters supporting coral reef	2
Regulatory	WQ Regs.	Eliminate the availability and use persistent pesticides	1
Regulatory	LE Regs.	Potential law enforcement strategies	
Regulatory	LE Regs.	Increase law enforcement presence in general and focus effort on resilient reef areas	39
Regulatory	LE Regs.	Provide dive operators with digital cameras to document violations	2
Regulatory	LE Regs.	Increase fishing & hunting fees to help fund natural resource law enforcement activities	2
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations. Whistle blower policy	1
Regulatory	LE Regs.	Use undercover inspectors on dive boats to find safety or environmental violations	1
Regulatory	LE Regs.	Legislative approval of money for law enforcement	1
Regulatory	LE Regs.	Allow citizens to file affidavits after witnessing reef violations	0
Regulatory	LE Regs.	Fines for loose traps and other damage	0