

现代海洋牧场构建技术创新与集成应用

Innovation and Integration of Modern Marine Ranching Construction Technology

成果简介:

针对海洋牧场定义模糊,缺乏建设标准等问题,出版专著并制定了海洋牧场系列标准,理念引领了海洋牧场建设;针对近海海草(藻)床受损、产卵场消失等生态系统荒漠化的突出问题,创新了生境构建关键设施与技术,实现了海洋牧场生境从局部修复到系统构建的跨越;针对牧场自然种群补充不足亟需人工修复等关键问题,突破了关键物种扩繁和资源修复技术,实现了生物资源从生产型修复到生态型修复的跨越;针对牧场资源生物修复效果难以评价、环境监测和风险预警预报技术亟待建立等关键问题,突破了牧场生境监测、评价和预警预报技术,实现了资源环境从单一监测评价到综合预警预报的跨越。应用示范结果表明,海洋牧场生境显著改善,生态系统更趋稳定,海洋牧场核心区多保持在一类水质,经济生物种类增加29-46%,资源量增加2倍以上,实现了企业发展与渔民收入同步提升,海域生态与产出效益同步改善。

Introduction:

In order to solve the problem of vague definition of marine ranching, lack of construction standards and other issues, monographs were published and series standards were established, which is leading the construction of marine ranching. In order to solve the problem of coastal desertification, i.e., damaged sea grass and sea weed bed, spawning sites, etc., we have studied and developed the key facilities and technologies of habitat construction, which rehabilitated habitat from local restoration to system construction. In view of the shortage of natural population recruitment, we have broken through the key species breeding and resource restoration technology, which facilitated the transformation of biological resources from production restoration to ecological restoration. To overcome the difficulties of forecast, control, supervision and management, we have broken through the technology of habitat monitoring, evaluation and early warning and forecasting, which leaped from single monitoring evaluation to comprehensive warning and forecasting. After application, marine habitat was improved significantly, and the ecosystem was becoming more stable. The water quality in the core area of marine ranching mostly maintained first class. Economic biological species increased by 29-46%, and the marine stock biomass increased by more than 2 times. The development of marine ranching enterprises and the growth of fishermen income were achieved synchronously, and the marine ecological and output benefits were improved simultaneously.



海洋生态牧场示意图

Schematic diagram of marine ecological ranching



海洋牧场监测平台

Marine ranching monitoring platform



山东省科学技术进步奖一等奖证书 专著《海洋牧场构建原理与实践》

Certificate of 1st prize of Shandong Provincial S&T Progress Award "The Construction Principles and Practice of Marine Ranching"

推荐单位 / Recommended Units

中国科学院海洋研究所
Institute of Oceanology, Chinese Academy of Sciences.

完成单位 / Accomplished Units

中国科学院海洋研究所
Institute of Oceanology, Chinese Academy of Sciences.
中国科学院烟台海岸带研究所
Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences.

合作单位 / The Main Cooperation Units

山东蓝色海洋科技股份有限公司
Shandong Blue Ocean Sci-Tech Co.,Ltd.
山东东方海洋科技股份有限公司
Shandong Oriental Ocean Sci-Tech Co.,Ltd.
青岛罗博飞海洋技术有限公司
Qingdao Robotfish Ocean technology Co., Ltd.
青岛龙盘海洋生态养殖有限公司
Qingdao Longpan Ocean ecological farming Ltd.
日照市岚山区前三岛水产开发有限公司
Rizhao city Lanshan district Qiansan Islands Aquaculture Development Ltd.
马山集团有限公司
Mashan Group Ltd.

社会效益和经济效益:

推动了海洋渔业的技术革新与产业升级,实现了山东半岛受损生境的有效改善和经济生物资源的持续利用,引领了我国海洋牧场的建设和发展。创建了“科研院所+企业+合作社+渔户”相结合的“泽潭模式”,渔户平均年收入由5万元提高到11万元。近三年示范推广面积45.6万亩,经济效益55.75亿元。通过人民日报、中国科学报、央视“焦点访谈”、“走进科学”等节目专访和系列科普报告,向社会各界宣传了海洋牧场建设对海洋环境保护、资源修复的重要作用,提高了全民保护海洋,合理开发利用海洋的科学意识。

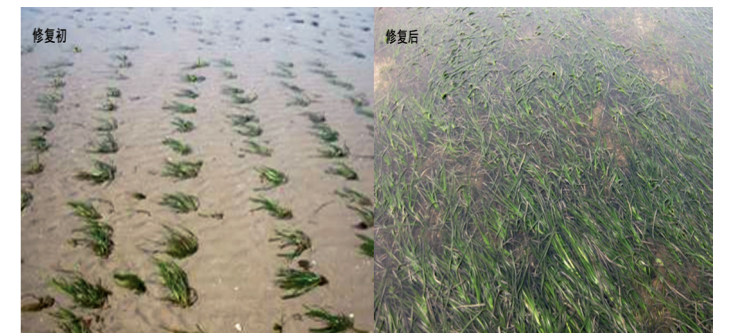
Economic and Social Benefits:

The marine fishery technological innovation and industrial upgrading were achieved. The damaged habitat was rehabilitated effectively, and the economical biological resources were utilized sustainably in Shandong Peninsula. The construction and development of marine ranching has been led and promoted in China. "Zetan model", which is a combination of "scientific research institutes + enterprises + cooperatives + fishermen", was created so that the average annual income of fishermen increased from 50,000 RMB to 110,000 RMB. Over the past three years, the demonstration area is 456 thousand mu and the economic benefits achieved 5.575 billion RMB. Through the popular science report and interviews by People's Daily, Chinese Science News, "Topics in Focus" and "Approaches to Science" of China Central Television, the important role of marine ranching construction on marine environmental protection and resource restoration was understood by all sectors of society. And the scientific awareness of ocean protection, rational development and utilization was improved.



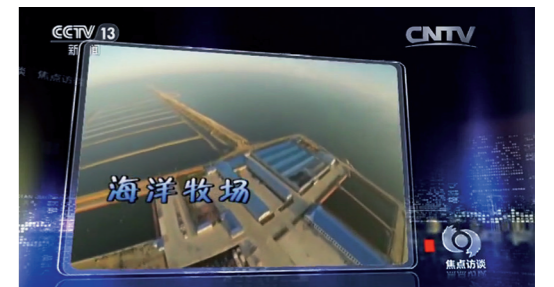
汪洋副总理视察莱州湾海洋牧场

Vice Premier Wang Yang inspected Laizhou Bay marine ranching



鳗草修复效果(左:开始修复时,右:修复1年后)

The effect of Zostera marina restoration (left: the beginning of restoration, right: after 1 year of restoration)



央视“焦点访谈”《海洋沙漠变牧场》

CCTV "Topics in Focus" "Change marine desert to ranch"

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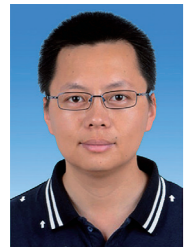
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Team leader, leading the new form of marine ranching, and construction of marine ranching security technology system.



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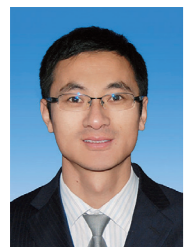
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Evaluation of carrying capacity of typical marine ranching, and construction of marine ranching monitoring and warning platform.



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Construction of marine ranching monitoring and warning platform.



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The R & D of marine ranching habitat resource restoration key facilities, and construction of marine ranching monitoring and warning platform.



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Construction of marine ranching monitoring and warning platform.



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Establishing series standards of marine ranching construction, and biological resources restoration of marine ranching.



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Seaweed (seagrass) resources restoration of marine ranching.



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Remote sensing technology of marine ranching.



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Biological resources restoration of marine ranching.



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Biological resources restoration of marine ranching.