

PROPOSITION DE SUJET DE THESE

Formulaire demande de financement : ARED - ISblue - ETABLISSEMENTS - ...

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NB : ce dossier ne vous dispense pas de déposer en parallèle votre dossier à la Région

Identification du projet

Acronyme du projet (8 caractères *maximum*) : PREQUOTEIntitulé du projet *en langue française* : Prévion des allocations et utilisations de quotas dans des pêcheries régulées par les captures : une analyse bio-économique.Intitulé du projet *en langue anglaise* : Predicting quota allocation and uptake in output-managed fisheries : a bio-economic analysis.

Présentation de l'établissement porteur (bénéficiaire de l'aide régionale)

Établissement porteur du projet : Ifremer

Ecole Doctorale : EDSML SP ou MATHSTIC pour les projets ISblue

Identification du responsable du projet (futur directeur de thèse)

Nom du laboratoire d'accueil : France : [UMR AMURE](#), Plouzané, France.

Code du laboratoire : UMR 6308

Directeur¹ du Laboratoire : Olivier Thébaud

Nom de l'équipe de recherche : No research teams

Nombre HDR dans le laboratoire : 15 Nombre de thèses en cours : 10 Nombre de post-docs en cours : 2

Nom et prénom du directeur* de thèse (HDR), porteur du projet : Olivier Thébaud, Senior scientist, Ifremer, France

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- Téléphone : +33 7 89 05 83 44

- Publications récentes du directeur de thèse (nb total et 5 références max au cours des 5 dernières années) : 325 references on [scholar](#) : 3875 citations, H-index 31, i10-index 81 (accessed via Harzing.com on 9/1/2021)

1. Briton Florence, Macher Claire, Merzereaud Mathieu, Legrand Christelle, Fifas Spyros, Thébaud Olivier Providing Integrated Total Catch Advice for the Management of Mixed Fisheries with an Eco-viability Approach . *Environmental Modeling and Assessment* 25 (3), 307-325.
2. Dépalle M., Sanchirico J., Thébaud O., Haynie A., O'Farrell S., Perruso L. (2020). Scale-dependency in discrete choice models: A fishery application. *Journal of Environmental Economics and Management*. 105.
3. Dépalle M., Thébaud O., Sanchirico J.N. (2020). Accounting for Fleet Heterogeneity in Estimating the Impacts of Large-Scale Fishery Closures. *Marine Resource Economics* 35 (4), 361-378.
4. Doyen L., Armstrong C., Baumgärtner S., Béné Christophe, Blanchard Fabian, Cissé Abdoul, Cooper Rachel, Dutra L.X.C., Eide A., Freitas D., Gourguet Sophie, Gusmao F., Hardy P.-Y., Jarre A., Little L.R., Macher Claire, Quaas M., Regnier E., Sanz N., Thébaud Olivier (2019). From no whinge scenarios to viability tree. *Ecological Economics*, 163, 183-188.

¹ Ce formulaire est rédigé en style épïcène

5. Planque Benjamin, Mullon Christian, Arneberg Per, Eide Arne, Fromentin Jean-Marc, Heymans Johanna Jacomina, Hoel Alf Håkon, Niiranen Susa, Ottersen Geir, Sandø Anne Britt, Sommerkorn Martin, Thébaud Olivier, Thorvik Thorbjørn (2019). A participatory scenario method to explore the future of marine social-ecological systems . *Fish And Fisheries*, 20(3), 434-451.

- **Expériences d'encadrement et co-encadrement de doctorants (passées et en cours)** : Co-supervision of 15 theses since the early 2000s, including the following over the last 6 years (one underway).

| Doctorant.e | Co-encadrants | Laboratoire d'accueil | Université | Thème de recherche | Situation actuelle | Financement | Situation professionnelle actuelle |
|----------------------------|---|---|--|---|-------------------------------|------------------------|--|
| 1. Cyria Bensebaini | Jean-Marc Fromentin (Ifremer, MARBEC), Grégoire Certain (Ifremer, MARBEC), Sophie Gourguet (Ifremer, AMURE) | UMR MARBEC (Montpellier) | Université de Montpellier | A MICE for the Gulf of Lions. | Thèse débutée en octobre 2020 | Ifremer | Contrat doctoral |
| 2. F. Briton | Claire Macher (Ifremer, AMURE), Caleb Gardner (UTAS), Rich Little (CSIRO) | AMURE, Brest & CSIRO, Hobart (Australie) | UBO et UTAS, co-tutelle internationale | Evaluation de règles de contrôle des captures pour des pêcheries mixtes sous quotas. | Soutenue 2020 | Ifremer / UTAS / CSIRO | Réalisation d'un projet professionnel personnel |
| 3. A. Lagarde | L. Doyen (U. Bordeaux) | GREThA, Bordeaux | Université de Bordeaux | Résilience et durabilité bio-économique des pêches et de la biodiversité marine en milieu corallien et tropical. | Soutenue 2020 | ANR / ATER | Recherche de post-doctorat |
| 4. M. Léopold | Anthony Charles (U. St. Mary, Canada) | AMURE, Brest | UBO, co-direction internationale | Exploration de la gouvernabilité des petites pêcheries dans le Pacifique sud par une démarche de recherche-action | Soutenue 2018 | IRD | Chercheur IRD |
| 5. M. Depalle | J. Sanchirico, (UC Davis, USA) | Dptmt. of Agricultural & Resource Economics, Sacramento (USA) | University of California, Davis (USA), co-direction internationale | Modèles dynamiques spatiaux de choix discrets : applications et enseignements pour la gestion durable des ressources marines. | Soutenue 2018 | UC Davis (USA) | Chercheur APESA, Roanne |
| 6. M. Tesson | L. Brigand (UBO) | GEOMER, Brest | UBO | Exploitation des ressources vivantes des îles en mer d'Iroise - recherche sur | Soutenue 2019 | UBO / Région Bretagne | Contractuelle UBO, Plateforme scientifique de Saint-Pierre et Miquelon |

le développement potentiel et la valorisation des activités liées à la mer.

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|------------------------|---|--|--|--|---|---------------------------|---|
| 7. K. Bentorcha | J. Pérez-Agundez (Ifremer) | AMURE, Brest | UBO | Modélisation de socio-écosystèmes à spécialisation conchylicole dans le cadre d'une approche écosystémique | Thèse débutée fin 2014, abandonnée début 2016 | Ifremer / Région Bretagne | Inconnue |
| 8. R. Girardin | P. Marchal (Ifremer) B. Fulton (CSIRO, Aus.) | Laboratoire halieutique, Ifremer, Boulogne-sur-Mer ; CSIRO Hobart (Australie) | Université de Lille, co-direction internationale | Ecosystem and fishers' behaviour modelling: two crucial and interacting approaches to support Ecosystem Based Fisheries Management in the Eastern English Channel. | Soutenue 2015 | Ifremer | Post-Doctorat à la NOAA (Seattle, USA), puis chercheur Ifremer Boulogne-sur-Mer |
| 9. J.B. Marre | J. Boncoeur (UBO) L. Coglan (QUT) S. Pascoe (CSIRO, Aus.) | AMURE, Brest ; CSIRO, Brisbane | UBO et QUT, co-tutelle internationale | Evaluation économique du capital naturel avec application aux récifs coralliens de Nouvelle-Calédonie et au littoral Australien | Soutenue 2014 | UBO / Région Bretagne | Coordinateur de projet, Commission du Pacifique Sud (Nouméa) |

Co-directeur de thèse : Professor Caleb Gardner, University of Tasmania (UTAS), Australia

Laboratoire de recherche : [Tasmanian Fisheries and Aquaculture Research](#)

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- **Téléphone :** +61 3 6226 8233

- **Expériences d'encadrement et co-encadrement de doctorants (passées et en cours) :** Co-supervision of 12 theses defended since the beginning of the 2000s, including the following over the last 6 years. Currently supervising 6 doctoral theses as main supervisor and 3 as co-supervisor.

| | Name | Completed | Supervision | Title | Employment |
|----|-------------------------------------|------------|---------------|---|---|
| 1. | Felipe Andres Briceno Jacques | 4/7/2016 | Co-supervisor | Understanding Predation Risk in Fisheries: Octopus depredation in the southern rock lobster (<i>Jasus edwardsii</i>) fishery in Australia | Chilean Government |
| 2. | Timothy James Emery | 28/10/2014 | Co-supervisor | Assessing the Cost and Benefits of Individual Transferable Quota Management in the Tasmanian Southern Rock Lobster Fishery, Australia | Australian Fisheries Management Authority |
| 3. | Anna Kirby Farmery | 25/10/2016 | Co-supervisor | An Assessment of the Environmental Performance of Seafood and the Implications for Food Systems | Univeristy Woolongong |
| 4. | Ivan Andres Esteban Hinojosa Toledo | 26/2/2016 | Co-supervisor | Settlement and Recruitment Processes in the Southern Rock Lobster, <i>Jasus edwardsii</i> : The influence of oceanographic features, pueruli behaviour and kelp habitat | Chilean Government |
| 5. | Ziya Kordjazi | 4/11/2015 | Co-supervisor | Exploring Biases in Estimating Survival Probability of Marine Resources from Mark-Recapture Analyses: A case study with the | Lecturer, Iran |

| | | | | | |
|----|-----------------------------|-----------|--------------------|---|------------------------|
| 6. | Rafael Ivan Leon Leiva | 27/7/2015 | Primary Supervisor | southern rock lobster <i>Jasus edwardsii</i> The Effect of Catch Shares Strength on Management of Marine Resources | University of Tasmania |
| 7. | Robert Wayne Ray Parker | 6/1/2016 | Primary Supervisor | Energy Performance of Wild-Capture Marine Fisheries at Global, Regional and Local Scales | Canadian Government |
| 8. | Ana Cecilia Villacorta Rath | 22/8/2018 | Co-supervisor | Population Connectivity of the Southern Rock Lobster, <i>Jasus Edwardsii</i> | Latrobe University |

Co-encadrante scientifique : Dr Claire Macher, researcher, Ifremer, France

Laboratoire de recherche co-encadrant : UMR 6308 AMURE

- **e-mail :** claire.macher@ifremer.fr

- **Téléphone :** +33 2 90 91 56 26

- **Expériences d'encadrement et co-encadrement de doctorants (passées et en cours) :** No current supervision of PhD students ; 2 PhD students co-supervised since 2013 ; HDR obtained in 2019.

| Doctorant | Co-encadrants | Laboratoire d'accueil | Université | Thème de recherche | Financement | Situation actuelle | Situation professionnelle actuelle |
|-----------------|---|--|--|---|----------------------------|----------------------|---|
| 1. F. Briton | Olivier Thébaud (Ifremer, AMURE), Caleb Gardner (UTAS), Rich Little (CSIRO) | AMURE, Brest & CSIRO, Hobart (Australie) | UBO et UTAS, co-tutelle internationale | Evaluation de règles de contrôle des captures pour des pêcheries mixtes sous quotas. | Ifremer et UTAS | Soutenue, 16.12.2020 | Réalisation d'un projet professionnel personnel |
| 2. M. Bellanger | O. Guyader (Directeur de thèse-HDR) | AMURE, Brest | UBO | Modélisation de mécanismes institutionnels et impacts bio-économiques de systèmes de gestion de quotas : application à la pêche de sole du golfe de Gascogne. | Ifremer et Région Bretagne | Soutenue, 18.05.2017 | Chercheur Ifremer |

Co-encadrant scientifique : Dr Richard Little, senior scientist, CSIRO, Australia

Laboratoire de recherche co-encadrant : CSIRO Oceans and Atmosphere

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- **Téléphone :** +61 3 6232 5006 / +61 404 658 056

- **Expériences d'encadrement et co-encadrement de doctorants (passées et en cours) :**

- 2 students currently co-supervised: Hill, N., Pethiyagoda, N.
- Past supervisions:
 - Briton, F. 2020. Application of the eco-viability approach for the management of mixed fisheries under catch control. Co-tutelle PhD thesis Université de Bretagne Occidentale, Brest, France, and the University of Tasmania, Hobart Tasmania.
 - Spanou, L. 2020. Mapping Community Values and Testing Trade-offs using Deliberative Methods. Ph.D. thesis, University of Tasmania, Hobart, Australia.
 - Gourguet, S. 2013. Ecological and economic viability for the sustainable management of mixed fisheries. Co-tutelle PhD thesis Université de Bretagne Occidentale, Brest, France, and the University of Tasmania, Hobart Tasmania.
 - Marzloff, M.P. 2012. Towards ecosystem-based management of Tasmanian temperate rocky reefs: Community dynamics models indicate alternative community states and management strategies. Ph.D. thesis, University of Tasmania, Hobart, Australia. 204p.
 - Hamon, K. 2011. Bio-economic response of the Tasmanian lobster fishery to ITQs. Co-tutelle PhD

thesis Université de Bretagne Occidentale, Brest, France, and the University of Tasmania, Hobart Tasmania, pp 199.

- Bergenius, M.A.J. 2006. Stock structure of a coral reef fish, *Plectropomus leopardus*: identification and implications for harvest strategy evaluation. PhD thesis, James Cook University, Townsville, Australia, pp. 159.

Financement du projet de thèse

En cas de financement à 50 %, le cofinancement est-il déjà identifié (oui/non) : yes.

Si oui, préciser la nature du cofinancement (ANR, partenaire privé, Ademe, etc.) : As for three co-supervised theses [Katell Hamon (2011), Sophie Gourguet (2013) and Florence Briton (2020)] already completed in the past with the partners, the fellowship application will be submitted for co-funding by the Doctoral Program in Quantitative Marine Sciences - QMS of UTAS. In addition, as for Florence Briton, an application for funding of a top-up budget (approximately AUD 15K) will also be submitted to CSIRO Oceans and Atmosphere. Additional applications for operating budgets will be submitted to Ifremer and the Center for Marine Socio-Ecology (CSIRO & UTAS), as well as to the French Embassy in Australia, as required. Like for the previous co-tutelle PhDs, this will provide the candidate with very favourable conditions for undertaking fieldwork, meeting with supervisors and other researchers, and attending scientific conferences and workshops.

Si le cofinancement n'est pas encore confirmé, date prévue de réponse du cofinancier : Requests for support from UTAS and CSIRO will be submitted in early February 2021, with responses expected in March-April.

En cas de non-obtention du cofinancement demandé, une autre source de cofinancement est-elle identifiée (oui/non) : yes.

Si oui, laquelle : The possibility of co-funding by NOAA (USA) will also be explored, within the framework of on-going collaborations between NOAA economists and AMURE researchers, including the supervisors.

Sollicitez-vous un co-financement Is-Blue (y compris ARED Is-Blue) (oui/non) ? yes

Important : Veillez à bien compléter les différents co financements sollicités sur le serveur Thèses en Bretagne Loire lors du dépôt de votre dossier.

Projet de thèse en cotutelle internationale

S'agit-il d'un projet de thèse en cotutelle internationale dans le cadre d'une convention (oui/non) : yes

Si oui, préciser l'établissement pressenti (et le pays de rattachement) : UBO (France) et UTAS (Australia).

Ce projet de thèse fera-t-il l'objet d'un cofinancement international (oui/non) : yes (see above)

(Rémunération du doctorant par l'établissement implanté sur le territoire régional (18 mois sur 36 mois), et l'établissement étranger, qui s'engage également à rémunérer le doctorant dans le cadre de son séjour à l'étranger, soit durant 18 mois -a minima-)

En cas de cofinancement international, préciser -si vous en avez connaissance- l'organisation du calendrier des périodes de séjour :

Préciser quel est le stade du projet international (joindre une lettre d'engagement du partenaire) : The project will build on existing, well-established collaboration relationships between the partners. Letters of commitment from the Australian partners of the project are attached to the application. The PhD candidate will be hosted by AMURE in Plouzané for the first 18 months of the research project, and in CSIRO in Hobart for the following 18 months (possibly extended to 24 months, if an extension is required and UTAS grants this). At least one visit will be planned in Hobart in the course of the first year, and one visit to Plouzané in the course of the third year. These visits are expected to last between three and four weeks, and will facilitate collaborations with the two supervisory teams, and their research groups. Timing of these visits will be adjusted as required depending on progress and needs. The PhD candidate will travel back to France for the defense at UBO, a few weeks before the final defense date.

Résumé du projet (4000 caractères maxi espaces compris) :

In recent years, the push towards Ecosystem-Based Fisheries Management (EBFM) has led fisheries management to evolve towards more comprehensive catch-based systems, aimed at taking into account the entirety of fishing impacts on marine biodiversity, including targeted and non-targeted species. Recent studies of the operation of such regimes have shown that such expansion raises a number of key questions as to the ways in which catch quotas are likely to be allocated and used by fishers, depending on the governance regime and production characteristics of the fishery under consideration, with ensuing consequences for management effectiveness.

In Individual Tradeable Quota (ITQ) systems, quota markets for jointly harvested species may not simultaneously clear. As a consequence, the equilibrium lease price of quota for a binding species is expected to measure the shadow value of their associated catch, while zero prices are expected for quota of non-binding species. Empirical observations however show that observed quota prices often do not match these predictions, prices paid for binding (respectively non-binding) species being lower (respectively higher) than expected from theory. Factors preventing quota prices from fully expressing the implicit value of limiting quotas remain poorly understood. Previous studies have pointed to a range of possible explanatory factors, including transaction costs due to imperfect and asymmetric information, social drivers, the role of barter or basket trades in multispecies systems, or formal and informal regulatory constraints.

Perfectly competing ITQ markets have also recently been shown to produce economic incentives to redirect fishing effort towards non-binding quota species, as well as species not under quota regulation, especially if fishers can easily target the latter. Such “spillover effects” may have important consequences for the ecological, economic and social performance of the fishery to which the quota management regime applies, as well as for the sustainability of the broader fishery system to which it belongs.

In addition to these drivers at the level of individual operators, the role of fishers cooperatives or producer organizations has also been identified as key to understanding the operation of catch share systems. Indeed, these organizations can play a key role in determining quota allocations, and in balancing catch and quota, for example by developing the coordination required to resolve externalities related to the temporal and spatial deployment of fishing activities, or by reducing monitoring costs and improving compliance with catch limitations.

Predicting the allocation and uptake of quota in catch-based fisheries management systems requires an improved understanding of the respective roles of these different drivers.

The aim of the doctoral research will be to carry out an in-depth economic analysis of the operation of selected catch share systems to identify the main drivers of quota allocation and uptake. The analysis will rely on existing data available to characterize quota allocation systems and ensuing quota uptake, as well as new data which can be collected via surveys. The results of this analysis will be then be used to inform the further development of existing bio-economic assessment approaches supporting fisheries management in France and Australia, and assess the likely consequences of alternative management strategies, from an EBFM perspective taking into account ecological, economic and social dimensions.

Keywords: Ecosystem-Based Fisheries Management, Catch shares, Individual Tradeable Quotas, Producer Organisations, Ecological-economic modeling, comparative research, French-Australian co-tutelle PhD.

Présentation détaillée du projet :

1 - Hypothèse et questions posées, état de l’art, identification des points de blocages scientifiques (4000 caractères maxi espaces compris)

In recent years, the push towards Ecosystem-Based Fisheries Management (EBFM) has led fisheries management to evolve towards more comprehensive catch-based systems, aimed at taking into account the entirety of fishing impacts on marine biodiversity, including targeted and non-targeted species (Garcia et al. 2003, Pikitch et al. 2004). Recent studies of the operation of such regimes (Briton et al., 2020) have shown that such expansion raises a number of key questions as to the ways in which catch quotas are likely to be allocated and used by fishers, depending on the governance regime and production characteristics of the fishery under consideration, with ensuing consequences for management effectiveness.

In Individual Tradeable Quota (ITQ) systems, quota markets for jointly harvested species may not simultaneously clear. As a consequence, the equilibrium lease price of quota for a binding species is expected to measure the shadow value of their associated catch, while zero prices are expected for quota of non-binding species (Briton, 2020). Empirical observations however show that observed quota prices often do not match these predictions, prices paid for binding (respectively non-binding) species being lower (respectively higher) than expected from theory. Factors preventing quota prices from fully expressing the implicit value of limiting quotas remain poorly understood. Previous studies have pointed to a range of possible explanatory factors, including transaction costs due to imperfect and asymmetric information (Squires, 1995), social drivers (Holland et al., 2013), the role of barter or basket trades in multispecies systems (Innes et al., 2014), or formal and informal regulatory constraints (Hatcher, 2014).

Perfectly competing ITQ markets have also recently been shown to produce economic incentives to redirect fishing effort towards non-binding quota species, as well as species not under quota regulation, especially if fishers can easily target the latter. Such “spillover effects” (Asche et al., 2007, Hutniczak, 2014) may have important consequences for the ecological, economic and social performance of the fishery to which the quota management regime applies, as well as for the sustainability of the broader fishery system to which it belongs.

In addition to these drivers at the level of individual operators, the role of fishers cooperatives or producer organizations has also been identified as key to understanding the operation of catch share systems (Bellanger, 2017). Indeed, these organizations can play a key role in determining quota allocations, and in balancing catch and quota, for example by developing the coordination required to resolve externalities related to the temporal and spatial deployment of fishing activities, or by reducing monitoring costs and improving compliance with catch limitations (Bellanger et al., 2019).

Without adequate understanding of effective quota allocation and uptake, the expected ecological, economic and social impacts of alternative Total Allowable Catch (TAC) recommendations can prove difficult to predict, creating major sources of uncertainty for fisheries management strategies (Fulton et al., 2011). Improved prediction of the allocation and uptake of quota in catch-based fisheries management systems thus requires an improved understanding of the respective roles of these different drivers.

2 - Approche méthodologique et techniques envisagées : (4000 caractères maxi espaces compris)

The aim of the doctoral research will be to carry out an in-depth economic analysis of the operation of selected catch share systems to identify the main drivers of quota allocation and uptake, and explore the bio-economic implications of better accounting for these drivers in the evaluation of management strategies. The analysis will rely on existing data available to characterize quota allocation systems and ensuing quota uptake, as well as new data which can be collected via surveys. The results of this analysis will be then be used to inform the further development of existing bio-economic assessment approaches supporting fisheries management in France and Australia, and assess the likely consequences of alternative management strategies, from an EBFM perspective taking into account ecological, economic and social dimensions.

The approach will be developed in **three stages**:

- **In stage 1**, a review of the state of the art regarding the understanding and modelling of mechanism determining quota allocation and uptake in catch-based fisheries management systems will be undertaken, building on the recent work of Briton (2020) showing the discrepancies between outcomes that a standard economic model would predict and observation. The review will enable further specifying of the key behavioural drivers that must be better understood, via empirical research, to explain allocation and uptake of catch quotas, as well as identifying the current status of efforts to incorporate these processes in fisheries models. Results of the review will be used to develop an analytical framework that can be applied to a range of case studies. This will be submitted for publication in a high impact journal in fisheries science.
- **Stage 2** will build on the prior research carried out by the co-supervisors and collaborators on the Bay of Biscay mixed-demersal fishery and the Australian South-East Trawl Fishery. The above analytical framework will be applied in the two case studies, using econometric analysis and available data on the operation of the management systems, including information on individual effort, catches, costs and earnings, as well as quota allocations and quota trades (both short-term leases and permanent sales), to predict quota allocation and uptake. Where required, additional information will be collected, via surveys of stakeholders in the two fisheries. Additional case studies from North America will also be considered, using similar data sets where available, as a means to examine the degree of generality of the results obtained in the French and Australian contexts. This research will lead at least one manuscript to be submitted in a high-impact peer reviewed resource economics journal, on the application of the analytical framework; results of the comparative analysis across management systems will also lead to a publication in a high impact factor fisheries science journal.
- **Stage 3** will focus on the development of process-based models capturing the key drivers identified in stages 1 and 2, and their inclusion in broader simulation frameworks used for fisheries management strategy evaluation. As stressed by Briton (2020), the modelling of quota allocation mechanisms in multi-species fisheries remains a largely underexplored topic worldwide (Sanchirico et al., 2006). A model capturing core properties of quota allocation processes under alternative management systems (e.g. ITQs versus fisher cooperatives) will be developed, and used to predict the role of the different behavioural drivers identified in stage 2, in determining quota allocation and uptake. This model will then be included in a larger bio-economic assessment framework, building on the [IAM modelling platform](#) developed by Ifremer as an operational decision-support tool for the impact assessment of alternative fisheries management strategies (Merzéréaud et al., 2011; Guillen et al., 2014; Briton et al., 2020), and already successfully applied to the two case studies (Briton, 2020). The use of IAM will enable the inclusion of uncertainty via the incorporation of stochastic parameter values relating to both the biological and the economic characteristics of the case study fisheries. This will enable predicting the effects of quota allocation and uptake on the ecological, economic and social outcomes of alternative fisheries management strategies. It is anticipated that this third stage will lead to the preparation of at least two publications in high-impact peer reviewed journals on (i) the economic model of key processes driving quota allocation and uptake; and (ii) the consequences of these processes on the effectiveness of alternative management strategies in the fisheries under consideration.

3 - Positionnement et environnement scientifique dans le contexte régional, national et international :

The project follows on from several jointly-supervised PhD research projects successfully carried out within the framework of the MoU associating UBO, UTAS, Ifremer and CSIRO. These include Katell Hamon (2011), Bretagne young researcher award 2015

(France); Sophie Gourguet (2013), 2015 winner of the thesis prize of the Albert I medals (Monaco); and Florence Briton (2020). Research results of the latter project are already being used in CSIRO scientific programs in support of federal fisheries management in South East Australia, and have been presented in the International Council for the Exploration of the Seas (ICES) working group on scientific expertise in support of the management of European mixed fisheries (WGMIXFISH).

The project will aim to examine new questions concerning fishing quota allocation and uptake, using a comparative approach mobilizing new data sets in the case studies already studied as well as in other contexts (in particular in the USA), as well as the modelling approach developed in collaboration with the above partners over the past fifteen years. From an administrative and supervision point of view, the project will rely on the experience acquired by the two universities and the co-supervisors in setting up and conducting co-tutelle PhD projects between UBO and UTAS, in collaboration with Ifremer and CSIRO. The project will also benefit from the collaboration between UMR AMURE and NOAA established over the last few years, on fisheries management and the analysis of governance systems, for access to data on US case studies, and the development of the analytical framework to approach these.

4 - Contexte scientifique et partenarial : éléments généraux (ERC, CPER, FEDER, Breizhcop ...) (4000 caractères maxi espaces compris)

The project will also benefit from the expertise of the research groups of the co-supervisors, which have acquired world-class recognition in the field of marine resource economics, fisheries science and modelling. The support of CSIRO and Ifremer will also enable access to the modelling tools and data that are effectively being used to support the management of the case study fisheries, hence providing an opportunity for the PhD candidate to directly contribute to the science which supports fisheries policy in both France and Australia. Participation in international networks to which the co-supervisors are members will also provide the candidate with opportunities to interact with a strong international network of researchers working in the field of the project, in particular through presentations at conferences. This includes the International Institute for Fisheries Economics and Trade (IIFET), ICES, the Marine Socio-Ecological Systems (MSEAS) network and the Resources Modelling Association.

References cited:

- Asche, F., Gordon, D. V., Jensen, C. L., Ussif Rashid, S., Munro, G. R., and Sutinen, J. G. (2007). Individual Vessel Quotas and Increased Fishing Pressure on Unregulated Species. *Land Economics*, 83(1), 41–49.
- Bellanger M. (2017). Modelling institutional arrangements and bio-economic impacts of catch share management systems : application to the Bay of Biscay sole fishery. *Economics and Finance*. Université de Bretagne Occidentale - Brest.
- Bellanger, M, Holland, DS, Anderson, CM, Guyader, O. (2019) Incentive effect of joint and several liability in fishery cooperatives on regulatory compliance. *Fish and Fisheries* 20, 715– 728.
- Briton F. (2020). Application of the eco-viability approach for the management of mixed fisheries under output control. Thèse en co-tutelle à l'Université de Bretagne Occidentale et à l'Université de Tasmanie, soutenue le 16 décembre 2020 à Plouzané (France) : 276p.
- Briton, F., Macher, C., Merzereaud, M., Le Grand, C., Fifas S., Thébaud O. (2020). Providing Integrated Total Catch Advice for the Management of Mixed Fisheries with an Eco-viability Approach. *Environmental Modelling and Assessment* 25, 307–325.
- Fulton, E.A., Smith, A.D.M., Smith, D.C. and van Putten, I.E. (2011), Human behaviour: the key source of uncertainty in fisheries management. *Fish and Fisheries*, 12: 2-17.
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Vous sollicitez un financement ISblue, ou une ARED ISblue :

Précisez le lien du sujet avec les thèmes ISblue

The focus of the project is on understanding and modelling of the dynamics and interactions between living marine resources, producer behaviour and fishing quota management systems in marine socio-ecosystems. As such, it falls mainly within the scope of Isblue theme 4. The topic also addresses the conditions for the ecological, economic and social sustainability of fisheries dependent coastal socio-ecological systems and as such is secondarily related to Isblue theme 3.

| Thème ISblue | Thème principal | Thème secondaire (si nécessaire) | Autre (si nécessaire) |
|---|------------------------|---|------------------------------|
| la régulation du climat par l'océan | | | |
| les interactions entre la Terre et l'océan | | | |
| la durabilité des systèmes côtiers | | 1 | |
| l'océan vivant et les services écosystémiques | 1 | | |
| les systèmes d'observation à long terme | | | |

Expliquez/précisez en quelques lignes dans quelle mesure votre demande correspond à l'un ou plusieurs des critères ISblue ci-dessous :

1- Originalité, impact potentiel du projet

Combining disciplinary and interdisciplinary approaches, the project proposes a novel perspective on the analysis of quota allocation systems to better understand, document and predict their evolution. The work will contribute to improve decision-support for fisheries management and a more rational and sustainable use of marine living resources. The research methods, modelling tools and results in terms of alternative strategy evaluations will be made available to the groups of experts supporting fisheries management at the European and Australian levels, to which the thesis co-supervisors regularly contribute, as part of their advisory roles in the International Council for the Exploration of the Sea (ICES), the European Scientific, Technical and Economic Committee for Fisheries (STECF) and the Australian Fisheries Management Agency (AFMA).

2- Positionnement international du sujet, cotutelle ou co-encadrement international

The PhD research will be carried out under a co-tutelle agreement between UBO (France) and UTAS (Australia). It will benefit from and reinforce previous international collaborations initiated between the research units involved in the supervision, as part of the MoU between UBO, UTAS, Ifremer and CSIRO signed in 2018. It will also provide opportunities to develop new collaborations in relation with the subject in France and Australia, as well as in other regions where quota allocation systems have been implemented, and for which cross-comparisons are relevant. In particular, the collaborators aim to develop links with colleagues from NOAA who have examined these systems in the United States. The PhD candidate will thus experience an international research environment throughout the duration of the project. She/he will also be encouraged to attend several international conferences, as well as presenting the research at meetings of the expert groups supporting fisheries management in Europe and Australia.

3- Effet intégrateur entre unités de recherche et / ou interdisciplinarités

The research will be based on integrated modeling approaches representing the interactions between resources, fishing fleet dynamics and institutional arrangements for the management of fishing quotas. It will thus rely on a strongly interdisciplinary bio-economic framework, building on the fields of population biology, economics and modelling, in collaboration with French (Ifremer-STH) and Australian fisheries researchers. The project will also involve transdisciplinary work associating representatives of the fishing industry, in order to gain practical understanding of the operation of quota allocation systems and determinants of quota uptake.

4- Potentiel d'insertion à un haut niveau dans la communauté académique ou non académique du docteur

The project will provide the PhD candidate with an exceptional opportunity to connect with the academic research community. The research will be built on at least three articles that are intended to be published in A-ranked journals, selected for their high impact both internationally and in French academic circles, in order to provide a diversity of post-doctorate opportunities to the candidate. The candidate will present her/his work in national and international conferences to facilitate networking and dissemination of the research work in academia. The candidate may also be

invited to present her.his work to Master students. Interactions with industry on the one hand and with management institutions on the other, in both France and Australia, will also open up professional opportunities in non-academic environments. The international co-tutelle experience will open up these opportunities for professional development at the global level.

Le candidat

Profil souhaité du candidat (spécialité/discipline principale, compétences scientifiques et techniques requises) :

The candidate should have an initial training in natural resource economics and/or bio-economic modelling. Prior experience with marine fisheries governance issues would be an asset.



6 January 2021

Collaboration with IFREMER and CSIRO on Fishery Quota Systems

This letter is to state support in principle for collaboration on research into fisheries quota systems, especially through the cotutelle PhD model as successfully applied in previously collaborations with CSIRO/UTAS and IFREMER/UBO. There is particular interest in the issues relating to quota allocation mechanisms across multiple species and their bioeconomic implications (comparing across different systems).

As with previous PhD projects the application would involve UTAS and CSIRO funding for 50% of the fellowship, as per our previous successful experience in doing this.

Best regards,

A handwritten signature in black ink, appearing to read "Richard Little".

L. Richard Little PhD

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Associate Editor, Canadian Journal of Fisheries and Aquatic Sciences

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Best Regards,



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