Overview
The WREN (IEA Wind Task 34) meeting was held April 4 – 5, 2016, in Dublin, Ireland. The purpose of this meeting was to discuss the status of key WREN activities, determine the next step for the in-progress projects, and develop input for the proposal extension of the Task to be submitted to IEA Wind Executive Committee for discussion in May, 2016. This in-person meeting included representatives from six of the ten member countries. Germany is temporarily not engaged in WREN as funding is not currently available to work on this task. France and Spain are new task members and have not yet attended an in-person meeting. A participant list can be found in Table 1. The meeting agenda is found in Attachment 1.

Table 1. Meeting attendees

<table>
<thead>
<tr>
<th>Country</th>
<th>Representative(s)</th>
<th>Affiliation</th>
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<tbody>
<tr>
<td>Ireland</td>
<td>Sinéad Cummins</td>
<td>BirdWatch Ireland</td>
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<td></td>
<td>John McCann</td>
<td>Sustainable Energy Authority of Ireland</td>
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<td></td>
<td>Mercedes Mira Costa</td>
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<td></td>
<td>Mark Jessopp</td>
<td>University College Cork, Ireland</td>
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<tr>
<td>Netherlands</td>
<td>Joop Bakker</td>
<td>Rijkswaterstaat – Branch Water, Traffic and Environment (WVL), Department of Water Quality and Nature Management (VWKN)</td>
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<tr>
<td></td>
<td>Marijke Warnas</td>
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<tr>
<td>Sweden</td>
<td>Annika Nilsson</td>
<td>Swedish Energy Agency</td>
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<tr>
<td>Switzerland</td>
<td>Hans Buser</td>
<td>nateco AG</td>
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<td></td>
<td>Muriel Perron</td>
<td>nateco AG</td>
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<tr>
<td>United Kingdom</td>
<td>Finlay Bennet</td>
<td>Marine Scotland Science</td>
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<tr>
<td>United States</td>
<td>Karin Sinclair</td>
<td>National Renewable Energy Laboratory</td>
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<td></td>
<td>Jocelyn Brown-Saracino*</td>
<td>U.S. Department of Energy</td>
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<td></td>
<td>Andrea Copping</td>
<td>Pacific Northwest National Laboratory</td>
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<td></td>
<td>Luke Hanna*</td>
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</tr>
</tbody>
</table>

*Participated via phone

Expected outcome of meeting:
1. Finalize Phase 1 Work Plan
2. Update on WREN Hub expansion and determination of next steps
3. Finalize next steps for completing and publishing Adaptive Management white paper
4. Determine next steps to develop Individual Impacts to Population Effects white paper
5. Determine status and addition of other white papers
6. Finalize 2016 webinar series topics; identify early 2017 topics
7. Finalize Outreach Plan
8. Finalize draft Task proposal extension; identify information gaps to address prior to ExCo submittal
9. Begin planning for Autumn 2016/Spring 2017 in-person meetings
10. Summarize action items

Review of Bern meeting Action Items and Work Plan
In reviewing the action items from the October 2015 meeting in Bern, Switzerland, the group determined that most items had been completed. Several were planned for further discussion during this meeting.

The 2012 – 2016 work plan was reviewed and finalized. This plan will be submitted to the IEA Wind Executive Committee ahead of the ExCo77 meeting scheduled for May 9, 2016. The work plan will also be posted on the IEA Wind Task 34 website, per the requirements of IEA Wind.

**ACTION 1:** Karin to submit work plan to IEA Wind ExCo no later than April 25. Karin will ensure the work plan is posted on the IEA Wind Task 34 website.

WREN Hub
Andrea provided a detailed summary on the continued development of WREN Hub, which is hosted on the Tethys website. A new front page has been developed, which should make it easier to get to WREN Hub. Statistics on number of documents in the database and use patterns was provided (see WREN Hub PPT provided during meeting). The upcoming Tethys peer review was discussed. It will engage 8-12 wind energy experts to review WREN Hub and Tethys through a series of questions. In addition, a small number of simpler questions will be put out for wider review, via Survey Monkey; participants will be solicited through the WREN email list used for Tethys Blasts, and via social media. PNNL is looking for peer reviewers and expects that WREN members or their delegates will participate. WREN members can delegate others by sending their names to Andrea. Mark indicated he would distribute the link on Facebook and other forums as well. Finlay would also like to send out to a group. Sinéad also has an external distribution list that the survey could be sent to. Andrea will prepare the questions for distribution.
A listing of new tags that have been added to documents on Tethys were discussed and suggestions for enhancements to the search tags for finding documents were made, including expanding the tags to make it easier to find information related to migration, nesting, overwintering, foraging, breeding, power lines, communications, infrastructure, environmental management issues, and interactions and displacement.

Members need to continually send reference documents for inclusion into WREN Hub, including non-peer reviewed documents, monitoring reports, theses, etc. If not in English, please provide an abstract in English. ACTIONS 2 & 3: Andrea will circulate the survey to WREN members, and others, once it is available; others will distribute via their various networks. Members need to continually send reference documents for inclusion into WREN Hub and to review tags to see if other inclusions are needed.

Individual Impacts to Population Effects journal manuscript. Finlay led the discussion of the status of the manuscript and expected next steps. Due to the absence of the lead author it was unclear what the current status of the manuscript is, but it is believed to be largely a scientific paper. WREN members also discussed using the manuscript as the basis for a white paper that will put more of a focus on the science interface with policy in the context of this topic. In addition, the white paper will expand to include a linkage to cumulative impacts. The Netherlands will take the lead on the next steps for this paper. There are several experts in NL that can contribute to this paper, including modelers. ACTIONS 4 & 5: Karin will check with Roel on the status of the manuscript and whether it will be ready to submit to a peer review journal by the end of 2016. Joop and Marijke will develop an outline for the white paper that will focus more on the science/policy interface, circulating to WREN members by the end of June.

WREN Webinars
A brief summary of the webinar series to date and proposed topics for future webinars was given by Karin. Webinars continue to be recorded and posted on the WREN Hub site at http://tethys.pnnl.gov/environmental-webinars?content=wind and statistics from WREN Hub indicate the webinars are being downloaded in larger numbers than the attendees at the webinars. As much pre-notification as possible was encouraged to increase the real-time participation in the webinars. Numerous suggestions for future webinar topics were discussed, including: HiWind offshore floating turbine (Norway); Principle Power floating turbine (Portugal); understanding the challenges of developers; white papers once they are completed (such as adaptive management); and topics from the Swiss Ornithological Institute (Felix Liechti). Sweden also provided several suggestions, including:

1. Mathias Andersson (mathias.andersson@foi.se) is a researcher at the Swedish Defence Research Agency, FOI, and his current study is about noise that occurs during piling in
the sea i.e. its character and noise level. Furthermore, the factors affecting the sound propagation in water is described and by using modelling this is visualized with a few examples. The technologies available today to mitigate the radiated noise is described as well as its impact on sound propagation will be demonstrated. The sensitivity and response of marine species during various life stages is described based on the literature, with a focus on the species: harbour porpoise, herring and cod.

2. Frank Johansson (frank.johansson@ebc.uu.se), researcher at Uppsala University. He has conducted a long term study on birds, especially waders on the island of Holmön in the north of Sweden, and by observing their movements also see if it’s possible to make adjusted restricted areas.

Green verses Green White Paper
Sweden has an interest in leading the writing team for this paper, but needs to check on the available resources. As a first step, Sweden will develop an outline for the paper and circulate to WREN members by the end of June. ACTIONS 6 & 7: Karin will circulate Roel’s original 2-page summary of the topic. Annika and Åsa will develop an outline for the white paper.

Environmental Risk Based Management White Paper
Andrea discussed the 2-page summary previously circulated that describes the intent of the Risk white paper. There was agreement that this topic is a high-valued topic for WREN to focus on. There was a suggestion that case studies comparing different risk models should be included in the paper. The US will take the lead on this paper. Other countries are encouraged to contribute. There was a request that this topic take a higher priority than the green verses green. Depending on who is contributing to which topics, a reprioritization may be made. More focus will be put on this topical paper in the coming year.

Adaptive Management White Paper
Luke Hanna (PNNL), who has taken over as lead author, provided an overview of the current status of the AM paper and changes made since the meeting in Bern. All WREN members carefully reviewed the document ahead of the meeting and provided feedback to Luke for completing the paper. Although much progress has been made on this current draft, it was noted that the paper still has too much US focus and there needs to be more focus on recommendations. It was also noted that the paper discusses AM on two levels. One is that decision makers are willing to take risk and learn from existing projects for use in future projects. This level has to define the standards for an appropriate monitoring and the way to interpret the outcomes. It is more of a scientific challenge. The second level is the use of AM within individual projects. This level is more about how to deal this uncertainty during the process of developing a project; it is more about policy and decision making. Currently, these two levels are sometimes mixed in the paper. Both should be treated appropriately. Finlay had quite a few comments and will send them in writing to Luke. With respect to the 16 US cases reviewed by Luke, several may not actually follow the DOI Technical Guide on AM and this may not qualify as meeting the intent of AM. Luke will review and revise as appropriate. Examples of the use of AM in other countries should be sent to Luke. Andrea and Luke will
April 5, 2016

develop a schedule to complete the AM paper. **ACTIONS 8 - 11**: Finlay to send Luke his comments on AM paper. Luke will review/revise summary of 16 cases where DOI AM Technical Guide was applied. Send examples of the use of AM to Luke. Andrea and Luke will develop a schedule to complete the AM paper.

Outreach and Engagement Plan
Andrea provided an overview of the Outreach and Engagement Plan developed for WREN. We discussed that there are other national sites that WREN should link to. For example, the International Council for the Exploration of the Seas (ICES) will have some products soon and we should definitely link to Tethys. It was also suggested that we draw a connection to humans, in addition to concerns over animals and their habitats. This could also include visual effects, etc. pertaining to social acceptance. Some important documents may not be available in English. Countries should consider having these documents translated to English for greater use through WREN Hub; at a minimum an abstract in English should be developed. We continued the discussion of who the target audiences are for WREN. For example, should the focus be on policy-makers and the science/policy interface? We discussed WREN’s need to understand how different countries address different issues. Thus, for the outreach plan we will need a menu of options. At the same time, we need to focus on a small number of projects. WREN does not need to develop products for the general public; instead, products should focus on meeting the needs of decision makers, who are often reached by agency staff and others with contacts to the decision-makers.

Each country has specific influences. Understanding who you want to reach will help determine what products could be the most valuable. WREN members should review the outreach and engagement plan and provide feedback on the construct, provide a list of which groups need to be reached, and what messages need to be provided. Some products will need to be developed to meet a specific country’s needs – and in the appropriate language.

Annika suggested that, while WREN Hub is useful, there are no syntheses on the state of the science. We discussed this being an initial concept of IEA Wind Task 34 but that the group decided not to pursue this activity. After much discussion, a new work package was added to the proposal extension to support this activity (see below) by developing one-page summaries of key science results. **ACTION 12**: WREN members to provide comments by early May on the outreach plan, including what specific topics, audiences, and level of efforts for key topics.

WREN in-person meeting hosts
Hosts for the next five (5) in-person meetings are as follows:

- Fall 2016 – The WREN meeting will co-locate with the NWCC Research Meeting to be held in Broomfield, Colorado, US, November 29 – December 2, 2016.
• Fall 2017 – The WREN meeting will co-locate with the CWW meeting to be held in Lisbon, Portugal, September 2017.
• Spring 2018 – Netherlands. This meeting is tentatively scheduled for May or June.
• Fall 2018 – United Kingdom. Dates and location to be determined.

IEA Wind Task 34 (WREN) proposal for extension
A draft proposal extension was discussed during the meeting. With input received from WREN members during this meeting, modifications to the proposal will be made. The sections we focused on included:
• Objectives/Expected Results (section 3)
• Task activities and member commitments (work packages, section 4)
• Schedule (section 5, Figure 3)
• Reports/deliverables (section 6, Table 1)
• Planned meetings (section 7, Table 2)
• Obligations (section 8, Table 3)
• List of Participants (section 14, Table 5)

With the input received during the meeting, Karin will develop a full extension proposal and distribute to WREN members for review. The proposal needs to be submitted to the IEA Wind Task 34 Executive Committee ahead of the ExCo77 meeting scheduled for May 9, 2016.

**ACTION 13**: Review and provide feedback on proposal extension to Karin by April 21, 2016.

**SUMMARY OF ACTION ITEMS:**
1. **Karin** to submit WREN work plan to IEA Wind ExCo no later than April 25. Karin will ensure the work plan is posted on the IEA Wind Task 34 website.
2. **Andrea** will circulate the peer review survey to WREN members, and others, once it is available; others will distribute via their various networks.
3. **WREN members** need to continually send reference documents for inclusion in WREN Hub.
4. **Karin** will check with Roel on the status of the manuscript and whether it will be ready to submit to a peer review journal by the end of 2016.
5. **Joop and Marijke** will develop an outline for this white paper, circulating to WREN members by the end of June.
6. **Karin** will circulate Roel’s original 2-page summary of the green v green topic.
7. **Annika and Åsa** will develop an outline for green v green white paper.
8. **Finlay** to send Luke Hanna his comments on AM paper.
9. **Luke** will review/revise summary of 16 cases where DOI AM Technical Guide was applied.
10. **WREN members** to send examples of the use of AM to Luke.
11. Andrea and Luke will develop a schedule to complete the AM paper.
12. WREN members to provide comments by early May on the outreach plan, including what specific topics and level of efforts for key topics.
13. WREN members to review and provide feedback on proposal extension to Karin by April 21, 2016.

ATTACHMENTS:
1. Final meeting agenda
2. WREN Hub presentation
3. Webinar series presentation
4. Adaptive Management presentation
5. Outreach and Engagement Plan presentation
6. Roel’s green v green summary paper
Attachment 1

WREN Meeting
April 4 – 5, 2016
Sustainable Energy Authority of Ireland
Dublin, Ireland
Agenda –FINAL 04/04/16

Expected outcome of meeting:

11. Finalize Phase 1 Work Plan
12. Update on WREN Hub expansion and determination of next steps
13. Finalize next steps for publishing Adaptive Management white paper
14. Determine next steps to develop Individual Impacts to Population Effects white paper
15. Determine status and addition of other white papers
16. Finalize 2016 webinar series topics; identify early 2017 topics
17. Finalize Outreach Plan
18. Finalize draft Task proposal extension; identify information gaps to address prior to ExCo submittal
20. Summarize action items

Day 1

9:00 Welcome
   Introductions
   Review meeting agenda
   Lead/Facilitator Karin/Sinéad/John McCann

9:15 Overview of WREN
   Review remaining action items from Bern meeting
   Review/finalize current Work Package
   Karin

10:00 Overview of progress on WREN Hub
   New features added since October meeting in Bern
   Upcoming peer review of Tethys
   Statistics on use patterns, other information on Hub
   Discuss/determine next steps
   Andrea

11:00 Break

11:20 Individual Impacts to Population Effects paper
   Overview of progress made to date
   Finlay
April 5, 2016

Summary of draft paper; plans for completion, peer review, and publication

12:30 Lunch

1:30 Webinar Series
   1. Topics to date and proposed future topics Karin
       2. Discuss future webinar topics/presenters All

2:00 Discussion of Other White Paper Topics
   1. Green vs Green Annika
       2. Risk paper Andrea (Jocelyn to call in)

3:00 Break

   Update and overview of progress
   Feedback on draft; plans for completion, including schedule

5:00 Adjourn

5:30 Group dinner (pay for your own meal)

Fire Restaurant & Lounge at The Mansion House, Dawson Street, Dublin
www.mansionhouse.ie

Day 2
9:00 Review Day 1 Karin

9:30 Outreach Plan Andrea
   Overview and discussion
   Table (outreach activities, by country)

10:45 Autumn 2016 (co-locating with NWCC meeting?) Karin
   Or Netherlands Autumn 2016 (or 2017) Marijke
   Spring 2017 meeting Annika
   Future meeting hosts All

11:15 IEA Wind Task 34 extension Karin
   Objectives/Expected Results (section 3)
   Task activities and member commitments (work packages, section 4)
April 5, 2016

Schedule (section 5, Figure 3)
Reports/deliverables (section 6, Table 1)
Planned meetings (section 7, Table 2)
Obligations (section 8, Table 3)
List of Participants (section 14, Table 5)

12:00  Lunch

1:00  Continue with proposal extension development  Karin

2:45  Break

3:00  Summarize action items  Karin

4:00  Adjourn