



MARINE MAMMAL COMMISSION

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Mr. Jon Kurland
Assistant Regional Administrator for Protected Resources
Protected Resources Division
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National Marine Fisheries Service
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Dear Mr. Kurland:

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the National Marine Fisheries Service's (NMFS) Draft Recovery Plan for the Cook Inlet Beluga Whale, along with the 15 May 2015 notice of availability and request for comments. NMFS also requested assistance from the Commission in completing a scientific peer review of the plan.

The Commission's review of the draft recovery plan includes (1) an assessment of the completeness of the plan, along with suggestions for including other pertinent information that is missing from the plan, and (2) an evaluation of the data with reference to plan recommendations, in accordance with NMFS's general guidance for peer reviews (NMFS 2010). The Commission is also providing additional information regarding the specific questions included in NMFS's peer review request, as well as other recommendations appropriate to the Commission's oversight responsibilities.

Background

The Endangered Species Act (ESA) requires the development of a recovery plan for listed species unless such a plan would not promote the conservation of the species. In this instance, the final recovery plan is an essential tool to promote recovery of Cook Inlet beluga whales by identifying (1) research and monitoring efforts needed to understand the natural and anthropogenic factors contributing to the decline of the population, and (2) recovery actions.

The draft recovery plan summarizes the status and natural history of the Cook Inlet beluga whale population, factors leading to its listing as endangered under the ESA, the essential features of critical habitat, and the work of the Cook Inlet Beluga Whale Recovery Team in developing a first draft of the plan. The draft plan also summarizes what is known about sources of mortality and injury, and identifies natural and anthropogenic threats that may be affecting the population's status and impeding its recovery. Finally, it outlines a recovery strategy and implementation schedule with prioritized research, management, monitoring, and outreach actions to stop the decline, prevent the extinction, and promote the full recovery of the Cook Inlet beluga whale population.

General Comments on the Draft Recovery Plan

The draft plan provides a reasonably complete assessment of the status of Cook Inlet beluga whales, causes of their decline, current distribution and habitat use, and natural and anthropogenic threats. However, it is apparent that there is incomplete information regarding which factors—biological, environmental, or anthropogenic—are most important as causes of the population’s continued decline.

Population monitoring

The research and management decisions made to date by NMFS have emphasized activities intended to document the beluga whale population’s abundance and trends. Annually from 1993 to 2012, and again in 2014, the National Marine Mammal Laboratory (NMML) conducted aerial surveys of the beluga whale population in the early summer, encompassing all known beluga whale habitat in Cook Inlet. Those surveys provided annual estimates of abundance. The most recent survey demonstrated a 0.4 percent average annual decline over the most recent 10 years (2004 to 2014) and a 1.3 percent average annual decline since management of the beluga whale hunt began in 1999 (Shelden et al. 2015). The abundance surveys were switched to a biennial schedule after 2012 (with no surveys conducted in 2013 or 2015) as a cost-saving measure (Hobbs et al. 2013). In addition to the annual (and now biennial) abundance surveys, NMML conducted August calf surveys from 2006–2010 which provided information on trends in annual calving rates and some information on population structure (Hobbs et al. 2012). The annual calf surveys are no longer being conducted.

In contrast, relatively few resources have been devoted to studies of movement patterns, habitat use, or vital rates. A tagging study of 14 whales conducted from 2000–2003 provided information on both fine-scale, daily movements and large-scale seasonal movements throughout the inlet (Hobbs et al. 2005). This type of information is particularly useful when integrated with data on environmental conditions (e.g., tides, ice cover, water temperature, river discharge rates) and anthropogenic activities and can help predict movements in response to changing conditions. Photo-identification surveys conducted since 2005 in the upper inlet have provided additional information on movements in prime habitat, as well as population metrics, body condition and health, and social behavior (McGuire et al. 2008, 2009, 2011, 2013, 2014a). An expansion of the project to waters off the Kenai peninsula from 2011–2013 provided much-needed information on occurrence, movements, and behavior of beluga whales in mid-inlet areas used historically, and on the extent to which animals from the upper inlet are also using mid-inlet waters (McGuire et al. 2014b).

The draft recovery plan identifies the continuation of aerial and vessel-based photo-identification surveys as a high priority for recovery of beluga whales, an assessment with which the Commission agrees. However, it appears that both types of surveys are projected to continue only at current levels (see section VII. Implementation Schedule, Action 1). Although the biennial abundance surveys may be adequate for determining trends over time, understanding the factors contributing to the population’s decline requires additional information on fine- and large-scale movements, habitat use, body condition, prevalence of injuries or disease, foraging and social behavior, and population dynamics. Expanded and consistently funded vessel-based photo-

identification surveys provide a non-invasive method of collecting this information as well as documenting associated environmental conditions. However, the spatial and temporal extent of the current photo-identification study may be inadequate. In addition, the resumption of annual calf surveys would provide much-needed information on calf production and calf survival to recruitment, which, coupled with information from individually-identifiable whales from photo-identification studies, can be robust indicators of population recovery. The Commission recommends that NMFS include, as a high-priority population monitoring action, the continuation and expansion of non-invasive population monitoring activities, such as aerial and photo-identification surveys covering all known beluga whale habitat in the upper and middle inlet. The Commission further recommends that NMFS identify the resumption of annual calf surveys as a high-priority population monitoring action.

The use of invasive research methods (e.g., biopsy sampling, tagging, and live capture health assessments) can be quite informative for population monitoring, as well as assessing reproductive status, overall health and fitness, hearing sensitivity, disease and pathogen prevalence, contaminant concentrations, and other factors that may indicate or affect recovery. However, there are legitimate concerns regarding the potential impacts associated with the use of these and other invasive research methods on vulnerable populations (McGuire and Stephens 2014). NMML has been issued a permit authorizing biopsy sampling and tagging of Cook Inlet beluga whales but has yet to initiate such research. The Commission recommends (1) that NMFS clearly and publicly identify the goals and objectives for conducting biopsy sampling and tagging before conducting such research, including specific causes of population decline and recovery actions that would be evaluated, and (2) that NMML coordinate such efforts with other researchers and non-governmental organizations (NGOs) working with beluga whales in Cook Inlet. The Commission further recommends that NMFS establish, as a high priority, a scientific advisory group composed of research scientists and veterinarians familiar with invasive research techniques to assess and provide guidance regarding NMFS's goals, objectives, and methodologies for biopsy sampling and tagging Cook Inlet beluga whales. The scientific advisory group can be established as a sub-group under the recovery plan implementation task force (see below), but in any case should work closely with that task force. In addition, the Commission recommends that before engaging in an expanded research program using invasive techniques, NMFS should design and commit sufficient funding for a monitoring program capable of detecting any adverse effects that might be associated with such research. For example, tracking data from tagged animals should be analyzed in near-real-time to detect deviations from expected patterns, along with increased monitoring to detect stranded animals and visual observations and frequent photographic documentation of biopsied or tagged animals to monitor behavior and health condition. An intervention plan should be in place to respond quickly to biopsied or tagged animals should problems be observed.

Recovery Plan Implementation

Other high-priority actions identified by NMFS include the appointment of a Cook Inlet beluga whale recovery coordinator, the creation of a Cook Inlet beluga whale recovery implementation task force, and the convening of an annual workshop to review pertinent data, plan for future data collection and analyses, and facilitate coordination of all beluga whale-related research. The Commission strongly supports these coordination actions, as regular review of research and recovery actions is essential to the adaptive management approach that NMFS has

identified as a goal for the plan. The Commission is nevertheless concerned about whether sufficient support exists within the agency for implementation of all identified high-priority recovery actions, given other competing agency priorities. The identification of Cook Inlet beluga whales as a “Species in the Spotlight” by NMFS indicates the agency’s commitment to give recovery of this population high priority; however, it does not appear that the agency is seeking additional funding as part of that program to expand its research and management programs beyond the status quo. The Commission therefore recommends that NMFS seek additional funding, or at least allocate more of its current funding, to Cook Inlet beluga whale conservation concurrent with the heightened attention NMFS has given to the recovery of this stock under the “Species in the Spotlight” initiative. Further in this regard, NMFS should take steps to ensure that the Cook Inlet beluga whale recovery coordinator reports to agency leadership so that they are fully aware of needed actions for species recovery when tough choices must be made regarding how to allocate limited resources and select among competing research needs.

Threats Management

NMFS has identified subsistence harvest of Cook Inlet beluga whales as the primary cause of the population’s historical decline. However, that decline continued even after the regulation of subsistence takes in 1999, albeit at a much slower rate than during the 1990s when overharvest reduced the population by more than 50 percent. NMFS has identified in the draft recovery plan a large number of natural and anthropogenic factors that could be impeding the recovery of Cook Inlet beluga whales. Indeed, it is likely some combination of multiple factors is causing the continued decline of the population. As a result, a comprehensive research and monitoring program is needed to identify which factors are the biggest contributors to the decline and to assess and mitigate the combined impacts of the full suite of environmental and anthropogenic stressors on Cook Inlet beluga whales.

The recovery strategy calls for a retrospective analysis of available data to determine whether each threat, by itself, is limiting recovery *before* further action is taken to collect additional data or develop remedial management actions. The Commission disagrees with this approach, as (1) a fairly comprehensive analysis of existing data has already been conducted in developing the draft recovery plan, (2) further analyses of existing data are unlikely to reveal any additional insights regarding the significance of identified threats, (3) data gaps have already been identified, and (4) the recovery plan represents an opportunity to initiate new research and data collection needed to identify and understand the potential risks associated with various types of activities, i.e. to formulate and implement a comprehensive research and monitoring program for Cook Inlet.

The recovery strategy also ranks each identified threat according to its relative importance for the conservation of Cook Inlet beluga whales. Given that the causes of the continued population decline and the contribution of each identified threat to the decline are unknown, the Commission believes that no potential threat factor should be ruled out in designing a comprehensive research and monitoring program. Therefore, the Commission recommends that all types of threats be given equal priority in recovery implementation until the cause(s) for the continued decline of Cook Inlet beluga whales has been determined. The Commission further recommends that NMFS eliminate the need to complete retrospective analyses of existing data as a prerequisite for conducting new or additional research or for timely implementation of necessary management actions.

Comprehensive Research and Monitoring

As the basis for a comprehensive research and monitoring program to guide recovery efforts, the Commission recommends that NMFS focus on the above-referenced population monitoring actions as well as the following cross-cutting research objectives and associated actions to assess and manage threats:

- Determining causes of death—Rapid identification, response, and collection of biological samples and other relevant information from stranded animals to determine causes of death as well as mortality rates, prevalence of disease or pathogens, body condition, diet, age, and other life history parameters. This may require the development/expansion of a citizen-based observing network that can accelerate the reporting of, and response to, live and dead stranding events. It may also require expanded partnerships with state and federal officials, NGOs, and industry to immediately mobilize stranding response efforts.
- Constructing a “soundscape” for Cook Inlet—As noted in previous Commission comments¹, the development of a soundscape for Cook Inlet is needed that identifies and characterizes sources of sound and variations in source levels on a daily, weekly, monthly, and annual basis. The geographic focus of studies should be on critical habitat, particularly in the upper inlet.
- Assessing the relative importance of various prey species and factors that may be affecting prey availability—Stock assessments (including escapement rates) of important prey species are needed to determine prey availability at different times of the year and how availability is affected by environmental conditions and anthropogenic activities. An energy budget should be constructed for beluga whales to determine food requirements at different times of the year and at different life stages to determine whether prey availability may be a limiting factor.
- Habitat modeling—A habitat model for Cook Inlet beluga whales should be constructed that identifies important habitat and variations in habitat use by whales in association with all known anthropogenic activities that have the potential to kill, injure, disturb, or adversely affect the health of beluga whales.
- Cooperative data collection, sharing, and analyses—A cooperative data collection, sharing, and analysis plan should be developed to ensure coordination and effective leveraging of resources among state and federal agencies, industry, and NGOs to maximize data collection and analysis efforts. This should be accomplished under the direction, and with the support, of the beluga whale recovery implementation task force.

To ensure the research and monitoring program is comprehensive, all known sources of takes must be accounted for and appropriate mitigation, monitoring, and reporting requirements must be in place. However, it is not clear whether all activities occurring in the inlet that have the potential to incidentally take beluga whales have been reviewed to determine whether issuance of an MMPA incidental take authorization is necessary and should be issued. If NMFS has determined

¹ See the Commission’s letter of 29 December 2014 with comments on NMFS’s intent to prepare a programmatic environmental impact statement for the issuance of a Marine Mammal Protection Act (MMPA) incidental take authorizations in Cook Inlet, Alaska.

that certain activities in the inlet would not result in a take of beluga whales under the MMPA and/or ESA, some degree of monitoring may still be necessary to validate those determinations. As such, the Commission recommends that NMFS develop and maintain a complete accounting of all anthropogenic activities in the inlet that may result in the taking of a beluga whale; this would assist in constructing a comprehensive habitat model for the inlet and in identifying important information gaps to ensure that adequate research and monitoring is being conducted and that activities limiting beluga whale recovery are identified and managed as effectively as possible. The Commission further recommends that NMFS place annual limits on the number and types of takes that are authorized for development and research projects, based on the most recent population estimate.

Peer Review Questions

1) Adequacy, thoroughness, and defensibility of ecological and biological information presented in the plan

The plan provides a comprehensive and fairly detailed summary of the status of beluga whales, trends in abundance over time, life history, behavior, sensory abilities, and habitat use within Cook Inlet. The plan also includes a summary of natural and anthropogenic threats, their potential impacts on beluga whales, and a ranking of each risk factor. The Commission noted some additional studies that were not included that may provide further insights, as identified below according to category:

Population monitoring

- Ashford, J.R., T. Ezer, and C.M. Jones. 2013. River discharge predicts spatial distributions of beluga whales in the Upper Cook Inlet, Alaska, during early summer. *Polar Biology* 36:1077–1087.
- Castellote, M., R.H. Leeney, G. O'Corry-Crowe, R. Lauhakangas, K.M. Kovacs, W. Lucey, V. Krasnova, C. Lydersen, K.M. Stafford, and R. Belikov. 2013. Monitoring white whales (*Delphinapterus leucas*) with echolocation loggers. *Polar Biology* 36:493–509.
- Ezer, T., J.R. Ashford, C.M. Jones, B. Mahoney, R.C. Hobbs. 2013. Physical-biological interactions in a subarctic estuary: how do environmental and physical factors impact the movement and survival of beluga whales in Cook Inlet, Alaska? *Journal of Marine Systems* 111–112:120–129. doi:10.1016/j.jmarsys.2012.10.007

Reproduction and health

- Litzky, L.K. 2001. Monitoring Recovery Status and Age Structure of Cook Inlet, Alaska Belugas by Skin Color Determination. Master of Science Thesis. University of Washington, Seattle, Washington, 76 pages.
- Norman, S.A., C.E.C. Goertz, K.A. Burek, L.T. Quakenbush, L.A. Cornick, T.A. Romano, T. Spoon, W. Miller, L.A. Beckett, and R.C. Hobbs. 2012. Seasonal hematology and serum chemistry of wild beluga whales (*Delphinapterus leucas*) in Bristol Bay, Alaska, USA. *Journal of Wildlife Diseases* 48(1):21–32.
- Robeck, T.R., L. Schmitt, and S. Osborn. 2015. Development of predictive models for determining fetal age-at-length in belugas (*Delphinapterus leucas*) and their application toward *in situ* and *ex situ* population management. *Marine Mammal Science* 31(2):591-611.

- URS Corp. 2011. Pathogens exposures for Cook Inlet beluga whales: A supplement to Chemical exposures for Cook Inlet beluga whales: a literature review and evaluation. Report prepared for NMFS, Anchorage, Alaska. NMFS contract no. AB133F-06-BU-0058, 31 pages.

Foraging behavior and habitat use

- Dutton, I.M., J.R. Klein, K.J. Cain, R. Deel, R. Federer, H. LeBail, and J. Hunt. 2012. An Oral History of Habitat Use by Cook Inlet Belugas in Waters of the Kenai Peninsula Borough. Final Report prepared by the Alaska SeaLife Center for the Kenai Peninsula Borough, 104 pages.
- Roy, N., Y. Simard, and C. Gervaise. 2010. 3D tracking of foraging belugas from their clicks: Experiment from a coastal hydrophone array. *Applied Acoustics* 71:1050–1056.

Types and potential impacts of natural and anthropogenic activities in Cook Inlet

- Norman, S.A. 2011. Anthropogenic and environmental stressors in Cook Inlet beluga whales (*Delphinapterus leucas*). Report prepared for NMFS, Anchorage, Alaska. NMFS contract no. HA133F-10-SE-3639, 113 pages.

Sensitivity to anthropogenic activities

- Castellote, M., T.A. Mooney, L. Quakenbush, R. Hobbs, C. Goertz, and E. Gaglione. 2014. Baseline hearing abilities and variability in wild beluga whales (*Delphinapterus leucas*). *The Journal of Experimental Biology* 217:1682–1691.
- Popov, V.V., V.O. Klishin, D.I. Nechaev, M.G. Pletenko, V.V. Rozhnov, A.Y. Supin, E.V. Sysuyeva, and M.B. Tarakanov. 2011. Influence of acoustic noises on the white whale hearing thresholds. *Doklady Biological Sciences* 440:332–334.
- Popov, V.V., A.Y. Supin, V.V. Rozhov, D.I. Nechaev, E.V. Sysuyeva, V.O. Klishin, M.G. Pletenko, and M.B. Tarakanov. 2013. Hearing threshold shifts and recovery after noise exposure in beluga whales, *Delphinapterus leucas*. *The Journal of Experimental Biology* 216:1587–1596.
- Popov, V.V., A.Y. Supin, V.V. Rozhov, D.I. Nechaev, E.V. Sysuyeva. 2014. The limits of applicability of the sound exposure level (SEL) metric to temporal threshold shifts (TTS) in beluga whales, *Delphinapterus leucas*. *The Journal of Experimental Biology* 217:1804–1810.
- Thompson, L.A. T.R. Spoon, C.E.C. Goertz, R.C. Hobbs, and T.A. Romano. 2014. Blow collection as a non-invasive method for measuring cortisol in the beluga (*Delphinapterus leucas*). *PLoS ONE* 9(12):e114062. doi:10.1371/journal.pone.0114062

Effects of anthropogenic activities on Cook Inlet beluga whales

- Kendall, L.S., A. Širović, and E.H. Roth. 2013. Effects of construction noise on the Cook Inlet beluga whale (*Delphinapterus leucas*) vocal behavior. *Canadian Acoustics* 41(3):3–13.
- Lyamin, O.I., S.M. Korneva, V.V. Rozhnov, and L.M. Mukhametov. 2011. Cardiorespiratory changes in beluga in response to acoustic noise. *Doklady Biological Sciences* 440(5):704–707.
- McGuire, T.L., C.C. Kaplan, M.K. Brees, and M.R. Link 2008. Photo-identification of beluga whales in Upper Cook Inlet, Alaska. 2008 Annual Report. LGL Alaska Research Associates, Inc., Anchorage, AK.

2) Thoroughness of threats assessment

NMFS has identified a thorough list of natural and anthropogenic stressors that may be contributing to the observed lack of recovery of Cook Inlet beluga whales. However, information to assess the relative contribution of each of those stressors is either unavailable or inadequate. That lack or inadequacy of information also makes it impossible to assess the cumulative impact of all stressors. As such, additional information is needed to conduct a thorough threats assessment. The Commission has provided recommendations for new and expanded data collection that would focus on increased population monitoring and a comprehensive research program that would take a more holistic approach to understanding which threats are having the greatest impact on recovery.

3) Ecologically and biologically defensible recovery strategy

For the reasons noted above, the requirement that each threat be assessed to determine whether it is a limiting factor for recovery before conducting additional research or implementing new management initiatives is not appropriate. Instead, NMFS should move forward in developing a comprehensive research and monitoring program that prioritizes the collection of information using methods that serve many purposes (e.g., enhancement of stranding response efforts and the development of a soundscape for the inlet).

4) Scientific defensibility of the recovery criteria

NMFS has proposed recovery criteria that are based on abundance estimates that have reached a certain percentage² of carrying capacity and have maintained positive growth for at least one generation (25 years). The recovery criteria also require that threats identified in the listing of Cook Inlet beluga whales be addressed. Those criteria differ from the recovery team's recommended criteria, which were based on the probability of extinction (for downlisting) or becoming endangered (for delisting) as determined from a Population Viability Analysis (PVA). Although the PVA approach would allow for incorporation of information regarding the relative contribution of different threats to the lack of recovery, the Commission agrees that basing the recovery criteria on abundance thresholds is appropriate when considerable uncertainty exists regarding PVA model inputs. However, the population growth rate must indicate a steady and consistent increase with a conservatively low (e.g., <0.20) coefficient of variation over the 25-year generation time.

5) Appropriateness and sufficiency of recovery actions in meeting the recovery goals

NMFS has identified a large number of discrete recovery actions designed to meet its recovery goals. However, it is not clear at this time whether the recovery actions are indeed sufficient or appropriate, as inadequate information exists regarding the causes for the ongoing lack of recovery. With respect to population monitoring, the plan should specify target confidence levels (e.g., <0.20 coefficient of variation) associated with abundance surveys, and the temporal and spatial extent of photo-identification surveys.

² 40 percent for downlisting and 60 percent for delisting

A comprehensive research and monitoring program combined with the use of the proposed recovery implementation team to review and assess new information annually concerning population parameters and threats should allow for a refinement and targeting of recovery actions to ensure the plan's recovery goals are met. This approach is consistent with NMFS's intent to follow an adaptive management approach to refine the plan over time.

6) Appropriate prioritization of the recovery tasks

The Commission is in general agreement with the draft plan's priorities for population monitoring and implementing recovery actions identified in the implementation schedule. However, the prioritization of threats can only be considered preliminary, as it is based on incomplete information. For example, the determination that pollution is a relatively low concern does not reflect the fact that sources of contaminants are increasing, particularly in the upper inlet where industrial activity and wastewater discharge are greatest. Biological sampling has been limited to date and has yet to assess concentrations of heavy metals and waterborne pathogens (Norman 2011). Expanded collection of biological samples from live and dead-stranded whales is needed to confirm the actual threat that pollution from these and other sources presents to the population. Similarly, although aerial surveys indicate that killer whales appear to be more concentrated in the lower part of the inlet (Shelden et al. 2013), evidence of predation by killer whales may warrant reassessment of predation as a limiting factor in recovery.

Additional references

The end of the references section contains additional references that were cited in the text of the recovery plan but were missing from the Literature Cited section. Also included are references not cited in the recovery plan but which provide benchmark information on Cook Inlet beluga whale status, trends in abundance, and research methods.

I trust these comments will be helpful to NMFS in finalizing the recovery plan. Please let me know if you have any questions.

Sincerely,



Rebecca J. Lent, Ph.D.
Executive Director

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- Hobbs, R., C. Sims, K. Shelden, L. Vate Brattström, and D. Rugh. 2012. Annual calf indices for beluga whales (*Delphinapterus leucas*) in Cook Inlet, Alaska, 2006-2010. Alaska Fisheries Science Center Processed Report 2012-05, 29 pages.

- Hobbs, R.C. 2013. Detecting changes in population trends for Cook Inlet beluga whales (*Delphinapterus leucas*) using alternative schedules for aerial surveys. U.S. Department of Commerce. NOAA Technical Memorandum NMFS-AFSC-252, 25 pages.
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- McGuire, T.L., M. Bles, and M. Bourdon. 2011. Photo-identification of beluga whales in Upper Cook Inlet, Alaska. Final report of field activities and belugas resighted in 2009. LGL Alaska Research Associates, Inc., Anchorage, AK, 53 pages plus appendices.
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- Shelden, K.E.W., C.L. Sims, L. Vate Brattström, K.T. Goetz, and R.C. Hobbs. 2015. Aerial surveys of beluga whales (*Delphinapterus leucas*) in Cook Inlet, Alaska, June 2014. Alaska Fisheries Science Center Processed Report 2015-03, 55 pages.

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References not cited in draft recovery plan but which provide benchmark information on beluga whale status, trends in abundance, research methods, and Cook Inlet ambient noise levels

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