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DAILY CURRENT AFFFAIRS-

1. **Hara Mangrove Forests**
2. **Friedreich's Ataxia**
3. **Anthropic's AI Watermarking for Claude**
4. **Ashoka-era Stupa at Vaishya Tekri, Ujjain**
5. **Green India Mission (GIM)**

1.Hara Mangrove Forests

Source: The Hindu

Why in News?

The Hara Biosphere Reserve in Iran's Persian Gulf is facing a major ecological threat from an oil spill originating from the bulk carrier Minoan Pioneer, with ongoing conflict in West Asia hampering cleanup operations.

Key Points

- The Hara Biosphere Reserve is located near Qeshm Island in southern Iran, around the Strait of Khuran and the Mehran River delta.
- The reserve is known for its extensive mangrove forests, which are primarily composed of the grey mangrove species Avicennia marina.
- The oil spill has reportedly spread across about 160 km, posing a serious threat to the mangrove ecosystem and associated marine life.
- The Hara forests are recognised as a UNESCO Biosphere Reserve and play an important role in coastal protection, biodiversity conservation and carbon sequestration.
- The mangrove root systems help protect coastal areas from erosion and provide important nursery habitats for fish, shrimp, crabs and other marine organisms.
- The forests also provide feeding and resting grounds for migratory birds, including herons and the great stone-curlew.
- Avicennia marina is adapted to saline environments through specialised roots that filter salt and glands in its leaves that excrete excess salt.
- Mangroves are important carbon sinks because they store substantial amounts of carbon in their vegetation and sediments.
- Oil pollution can severely damage mangrove ecosystems because oil coats aerial roots or pneumatophores and interferes with their gas exchange.

- Prolonged oil exposure can result in vegetation damage and mortality and can disrupt the breeding and feeding grounds of marine organisms.
- The ongoing conflict in West Asia is making access and cleanup operations difficult, increasing the risk of prolonged ecological damage.

UNESCO's Man and the Biosphere (MAB) programme

UNESCO's **Man and the Biosphere (MAB)** programme, launched in 1971, is the backbone of this global initiative. It moves beyond the idea of isolated wilderness, treating human communities as an integral part of the ecosystem.

Global Landscape (2026 Status)

As of **June 2026**, the World Network of Biosphere Reserves (WNBR) has grown to **797 sites** across **145 countries**.

- **Recent Expansions:** In June 2026, 14 new sites were added, including first-time designations for **Montenegro** (Skadar Lake), **Timor-Leste**, and **Aruba**.
- **The Hangzhou Strategic Action Plan (2026–2035):** Adopted in late 2025, this plan charts the course for the next decade, focusing on ecosystem resilience and youth leadership.
- **A Historic First: Québec City** (Canada) was designated in 2026 as the world's first predominantly **urban biosphere reserve**, proving that even dense cities can be engines of ecological stewardship.

IN Biosphere Reserves in India

India currently has **18 notified Biosphere Reserves**, of which **13** are part of the UNESCO MAB World Network.

Feature	India's Record
First BR	**Nilgiri** (1986) - spanning Tamil Nadu, Kerala, and Karnataka.
Largest BR	**Great Rann of Kutch** (Gujarat).
Smallest BR	**Panna** (Madhya Pradesh).
Latest UNESCO Entry	**Cold Desert** (Himachal Pradesh) - added in 2025.

UPSC Prelims Question

Consider the following statements regarding mangrove ecosystems:

1. Mangroves can provide protection against coastal erosion.

2. Mangrove ecosystems can serve as nursery grounds for several marine species.
3. Avicennia marina is adapted to saline conditions through specialised mechanisms for salt management.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (d)

UPSC Mains Question

Mangrove ecosystems perform important ecological and socio-economic functions but remain highly vulnerable to pollution and coastal disturbances. Discuss the ecological impacts of oil spills on mangroves and suggest measures for their conservation.

2.Friedreich's Ataxia

Source: The Hindu

Why in News?

A new study has traced the genetic origins of Friedreich's ataxia (FRDA) to specific variants that emerged in Eurasia around 9,000 years ago, helping explain why the disorder is predominantly found among populations of Eurasian ancestry.

Understanding the Disease

- **Genetic Root:** FA is an **autosomal recessive** disorder caused by a mutation in the **FXN gene**. This gene is responsible for producing the protein **frataxin**, which is vital for the proper functioning of **mitochondria** (the cell's powerhouse).
- **Pathophysiology:** A deficiency in frataxin leads to iron buildup in the mitochondria, causing oxidative stress and cellular damage. This damage primarily affects the **dorsal root ganglia** of the spinal cord and the **cerebellum** (the part of the brain that controls balance).
- **Symptoms:**
  - **Ataxia:** Unsteady gait, frequent falling, and loss of balance (usually the first sign).
  - **Neurological:** Slurred speech (dysarthria), loss of reflexes, and difficulty swallowing.
  - **Physical:** Curvature of the spine (**scoliosis**) and foot deformities (high arches).

- **Systemic:** Thickening of the heart muscle (**hypertrophic cardiomyopathy**) and, in some cases, diabetes

Key Points

- Friedreich's ataxia is a genetic disorder that progressively damages the nervous system and heart, with symptoms commonly appearing between the ages of 5 and 15.
- The disorder is associated with mutations in the FXN gene, which codes for frataxin, a protein essential for mitochondrial function.
- The mutation involves an abnormal expansion of repeat sequences within an intron of the FXN gene, resulting in reduced production of frataxin.
- Reduced frataxin levels impair mitochondrial functioning and their ability to produce ATP, the primary energy currency of cells.
- The resulting cellular dysfunction can cause problems such as impaired coordination, slurred speech, difficulty swallowing, vision and hearing deterioration, and fatigue.
- The study found that the disease-causing expanded variants originated from two specific long-normal variants that underwent mutation at two different historical points in Eurasia.
- Ancient DNA evidence indicates that these two protomutations were present in Europe and Western Asia at least 9,000 years ago.
- Protomutations are abnormal but initially non-disease-causing variants that can gradually expand over generations and eventually develop into disease-causing mutations.
- The geographical distribution of FRDA is linked to the historical presence of these specific genetic variants and mutation events rather than to the general occurrence of genetic mutations.
- The disorder is predominantly reported among people of Eurasian ancestry, including European, North African, West Asian and South Asian populations.
- The absence of FRDA in sub-Saharan Africa and East Asia has been linked to the apparent absence of the specific long-normal variants or the historical mutation events associated with the disease.
- In India, the Nizam's Institute of Medical Sciences reportedly diagnoses about one FRDA case every month, with cases predominantly associated with consanguineous marriages.

UPSC Prelims Question

Consider the following statements regarding Friedreich's ataxia:

1. It is associated with mutations in the FXN gene.
2. The disease involves reduced production of the frataxin protein.
3. Impaired mitochondrial function is associated with the disorder.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (d)

UPSC Mains Question

What are the genetic and mitochondrial mechanisms associated with Friedreich's ataxia? Explain how the historical origin of disease-causing variants can help understand the geographical distribution of genetic disor

3.Anthropic's AI Watermarking for Claude

Source: Indian Express

Why in News?

Anthropic has introduced a global watermarking system for content generated by its Claude AI models, embedding invisible and machine-readable signals into AI-generated text and multimedia content to improve transparency and enable identification of AI-generated material.

Key Points

- Anthropic has introduced watermarking for content generated through its Claude AI systems as part of its efforts to improve transparency around AI-generated content.

- The watermark is embedded at the model level and remains imperceptible to users while being detectable by machines.
- The watermarking mechanism is designed to remain associated with the generated text even when the content is copied, pasted or subjected to some forms of editing.
- The system applies to content generated through Claude Platform (API), Claude, Claude Code, Claude Cowork and Claude Tag.
- The watermarking also covers Claude access through platforms such as AWS, Google Cloud and Microsoft Foundry.
- Anthropic's move is linked to its commitment to the EU AI Act's Article 50(2) Code of Practice on Transparency of AI-Generated Content.
- The transparency framework seeks to provide signals that can help regulators, fact-checkers and other users identify the origin of AI-generated material.
- The policy covers both text and multimedia content generated through Claude.
- The introduction of text watermarking has raised concerns about possible reputational risks because content that has received only limited AI assistance, such as proofreading or summarisation, could potentially be identified as AI-generated.
- Anthropic has acknowledged that watermark detection can produce false positives and false negatives, particularly depending on factors such as the length of the text and changes made after generation.

- The development highlights a broader challenge in AI governance: balancing transparency and accountability with users' concerns over attribution, authenticity and legitimate use of AI-assisted content.
- The EU AI Act places transparency obligations on providers and deployers of certain AI systems, with the relevant Article 50(2) compliance requirements becoming enforceable from August 2, 2026.

Key Technologies & Frameworks

Modern watermarking uses a **multi-layered approach** to ensure authenticity cannot be easily stripped.

1. **C2PA (Content Credentials):** An open standard that attaches a "manifest" to a file, do cumenting its history (who made it and how).
    - **Hard Binding:** Cryptographically signed metadata.
    - **Soft Binding:** Storing a "perceptual hash" in a cloud registry so the original ma nifest can be recovered even if the metadata is deleted.
2. **SynthID (Google DeepMind):** An invisible, robust watermark now adopted by **Google , OpenAI, Nvidia, and ElevenLabs**. It is designed to survive heavy editing and screens hots.
    - **Example:** OpenAI announced in May 2026 that it would layer SynthID waterm arks onto all DALL-E 3 and API-generated images alongside C2PA metadata.

UPSC Prelims Question

Consider the following statements regarding AI watermarking:

1. An AI watermark can be designed to remain imperceptible to users while being detectable by machines.
2. AI watermarking can help identify the origin of AI-generated content.
3. AI watermarking completely eliminates the possibility of false positives and false negatives.

Which of the statements given above is/are correct?

(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Answer: (a)

UPSC Mains Question

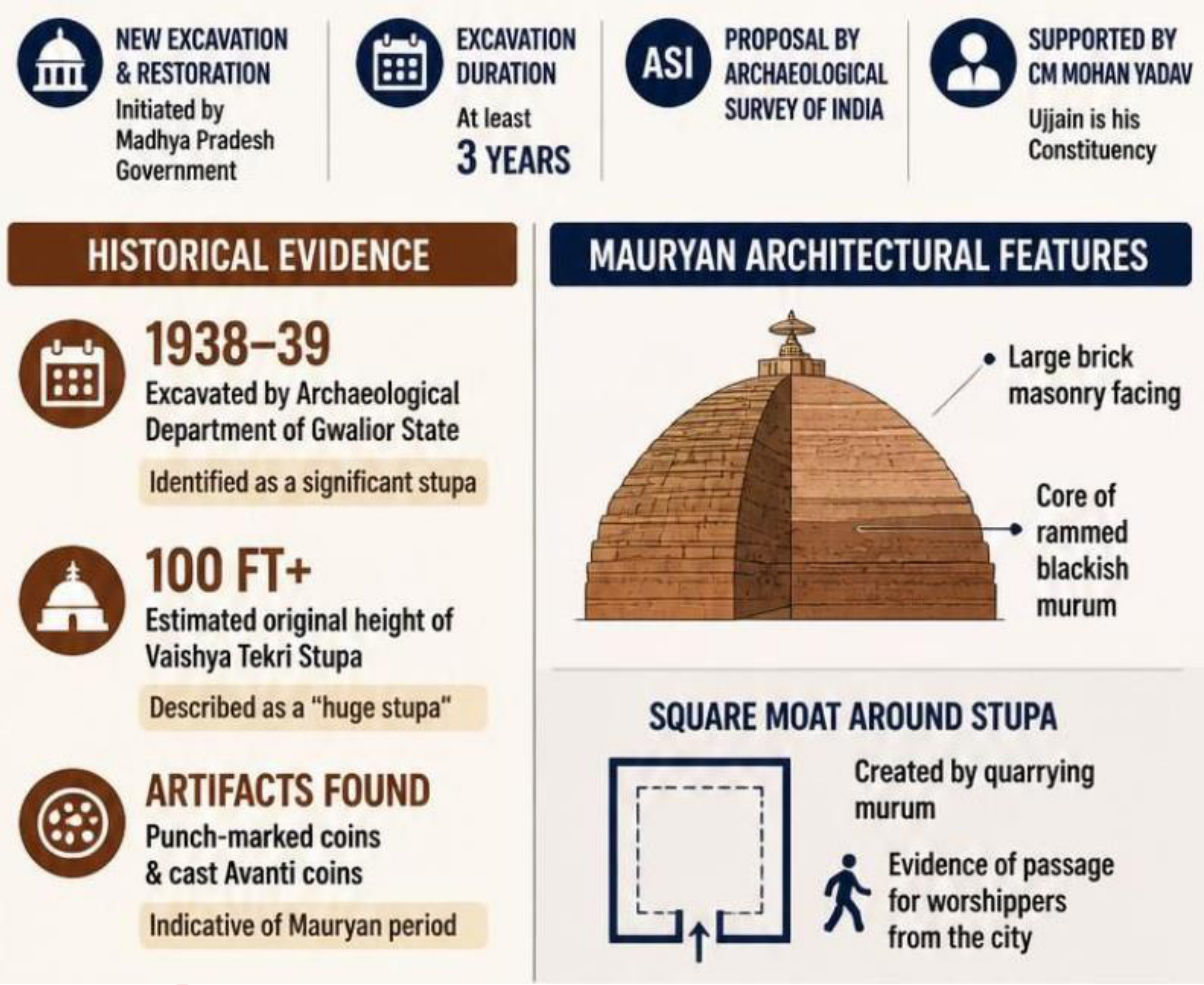
AI-generated content creates new challenges for transparency, attribution and accountability. Discuss the role of technological measures such as AI watermarking in addressing these challenges.

4.Ashoka-era Stupa at Vaishya Tekri, Ujjain

Source: Archaeological Survey of India (ASI) proposal and reports of earlier excavations

Why in News?

The Madhya Pradesh government has initiated a fresh excavation and restoration project at Vaishya Tekri in Ujjain, nearly 90 years after the site was first excavated, to investigate a massive stupa believed to date to the Mauryan period and potentially larger than the Sanchi Stupa.



Historical Significance

- Vaishya Tekri is believed to contain a major stupa associated with the Ashoka-era Mauryan period.
- Ujjain was an important centre in the Mauryan period, and Emperor Ashoka is traditionally associated with the city before becoming emperor.
- Earlier excavations during 1938–39 by the Archaeological Department of Gwalior State identified the mound as a significant stupa.

- The excavation report described Vaishya Tekri as a "huge stupa" with an estimated original height of at least 100 feet.

Archaeological Evidence

- The proposed stupa has an estimated base of around 350 feet in diameter, indicating a structure potentially much larger in scale than the Sanchi Stupa.
- The structure contains a core made of rammed blackish murum, faced with exceptionally large brick masonry, features considered indicative of the Mauryan period.
- The discovery of punch-marked coins and cast Avanti coins during the earlier excavation provides additional evidence supporting its association with the Mauryan period.
- Archaeologists found evidence of a regular square moat created by quarrying murum around the stupa.
- A passage associated with the structure appears to have facilitated the movement of worshippers from the city towards the stupa.

Recent Initiatives & Projects (2024-2026)

The ASI has shifted toward a more collaborative and technology-driven approach in recent years:

- **Adopt a Heritage 2.0:** Launched in late 2023, this scheme encourages private and public sector companies to adopt monuments to provide and maintain basic ameni ties. By March 2026, over **30 MoUs** were signed under this program.
- **Digitization:** Under the **National Mission on Monuments and Antiquities (NMMA)** , the ASI has documented approximately **1.84 lakh monuments** and **17.20 lakh ant iquities** in a national database as of 2026.
- **Major Restorations:** Meticulous restoration of the **Kalyana Mandapa** at the **Thous and Pillar Temple** in Telangana was a significant milestone completed in 2025-26.
- **Underwater Archaeology:** Increasing focus on maritime heritage through the Und erwater Archaeology Wing (UAW).

Engineering Features

- The stupa's base incorporated a distinctive bowl-shaped masonry design that helped support the superstructure and resist oblique thrust.
- The construction techniques and large-scale brick masonry indicate considerable engineering expertise among the ancient builders.

- The combination of the massive dimensions, structural design and archaeological remains makes Vaishya Tekri an important site for understanding Mauryan-period architecture.

Fresh Excavation and Restoration

- The Archaeological Survey of India has submitted a proposal for fresh excavation and restoration of the site.
- The excavation is expected to take at least three years because of the scale of the mound and the archaeological investigation required.
- The current project requires acquisition of surrounding private land, and the Ujjain district administration has already submitted a proposal for the required land acquisition.
- The renewed excavation could provide further evidence about the chronology, construction and religious significance of the stupa and strengthen understanding of Ujjain's role in the Mauryan period.

5.Green India Mission (GIM)

Source: The Hindu

About the Mission

- The Green India Mission (GIM) was launched in 2014 as a Centrally Sponsored Scheme under the National Action Plan on Climate Change (NAPCC).
- It is aimed at protecting, restoring and enhancing India's forest and tree cover while addressing climate change through both adaptation and mitigation measures.
- The mission also seeks to improve ecosystem services such as biodiversity conservation, water regulation and carbon sequestration, while enhancing forest-based livelihoods.
- The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal ministry.

Targets

- The mission initially targeted an increase in forest and tree cover over 5 million hectares and improvement in the quality of forest and tree cover over another 5 million hectares.
- It also envisaged enhancing annual CO_2 sequestration by 50–60 million tonnes.

- The broader national climate commitment is to create an additional carbon sink of 2.5–3 billion tonnes of CO_2 equivalent by 2030 through additional forest and tree cover.

Key Concern

- Recent CAG observations have flagged significant shortcomings in the implementation of the Green India Mission, raising concerns about whether the mission is progressing adequately towards its forest restoration, carbon sequestration and climate-resilience objectives.